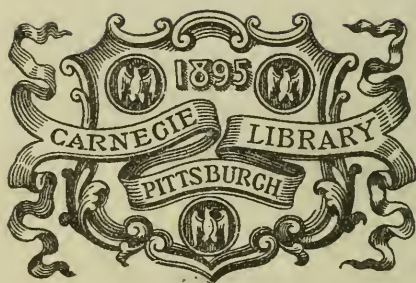


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A DUTY AS WELL AS A RIGHT

It is, in my opinion, not only the right but the duty of a railroad to present these matters to the public from its viewpoint, but in so doing it should be scrupulously accurate in its statements of facts."—*Hon. Charles A. Prouty, I. C. Commission.*

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COMPILED AND EDITED BY

SLASON THOMPSON

DIRECTOR OF BUREAU OF RAILWAY NEWS

AND STATISTICS

CHICAGO

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STROMBERG, ALLEN & Co.
CHICAGO, 1913

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INTRODUCTION.

FOLLOWING the general scheme of its predecessors, this, the fourth issue of the *Railway Library*, brings between boards selections from the noteworthy addresses and papers of the year 1912 relating to railway subjects. It opens with a brief excerpt from the special American Railway Edition of the *London Times*, which refers to the splendid spirit and faith that projected and built the railways of America out into the boundless wastes of a sparsely peopled continent. This is followed by the valedictory of James J. Hill, whose "Life Adventure" spans the period from the days when railways preceded settlers to our own times, when their problem is one of providing adequate transportation for an industrial nation of nearly 100,000,000 souls.

Railway rates and railway valuation naturally occupy a prominent and significant place in this issue of the *Library*; and so the opinion of Justice Hughes in the Minnesota rate case, although not delivered until June, 1913, finds its appropriate setting amid the railway literature of the preceding year. It is given *in extenso*, the only omission being the legal citations, which are generally more distracting than illuminating to the lay mind. This opinion should be studied in connection with the findings of fact by Judge Otis and the decision of Judge Sanborn in the case under review, given in the *Railway Library* for 1910. Although no new legal principle is enunciated, delimitation of state and national authority is set forth afresh with exhaustive perspicacity. The decision of the lower court and the finding of the Master are overruled on the question of valuation.

The railways can bide their time until Congress or the Interstate Commerce Commission puts the federal quietus on state interference with interstate rates; but the existence of a "railway value" for lands needed for railway purposes will not down at the bidding of courts

or college professors. The railway service and facilities which Judge Prouty, in another paper, says are "obligatory" wait upon the "railway value" at every terminal. It is the salt with which condemnation juries season so highly their awards for property taken for public use, whether in rural meadows or crowded city lots, whether measured by the acre or the square foot. It is this "railway value" that James J. Hill has in his mind's eye when he estimates the present and future needs of the railways for greater terminal facilities in terms of billions. It is no more speculative than Galileo's assertion of the Copernican theory.

The illustrated article on the New York Central's new station in New York illustrates how enormous is the cost for modern terminals, for passenger traffic alone; whereas convenient terminals for freight are the more essential.

The problem of safety in railway operation and service receives attention in several articles. Railway nationalization is discussed in the abstract and in the concrete examples of Australia and France. The remuneration and hours of railway employes in Germany and the United Kingdom are exhaustively treated, and the various angles of compulsory arbitration are set forth in an animated discussion in the "Société d'Etudes Législatives," Paris.

The latest information available respecting the railways of the United States in detail and of the world in general is furnished in the concluding chapter of the *Railway Library*.

The index at the end of the volume fairly reflects the comprehensive nature of this issue.

July 21, 1913.

S. T.

ROMANCE AND REALITY.

From the *London Times*.¹

The history of American railroads is full of human interest and will be found fascinating by anyone who can sympathize with human effort. They did not begin, like ours, in the midst of a settled rural population ripe for some great improvement in the means of transit. Nor did they, like ours, connect flourishing cities having large business relations only awaiting further development. They were flung out over boundless wastes inhabited by wild beasts and red Indians, much as the gossamer throws its delicate lines upon the summer air. They were built in faith that the population would come and that the cities would arise—a faith fully justified by events, but resting at the time upon evidence so slight that the British investor whose money mainly paid for construction would have tightened his pursestrings had he known the real state of the case. The builders seem to have had but one desire—to push further and ever further into the empty continent. Their building was hurried and flimsy. The single-track lines just held together under very moderate traffic; and American railroads suffer to this day the consequences of that initial insufficiency. Enormous capital has been sunk in the conversion of the unsubstantial lines into the solid and heavily metalled railroads that now serve a vast and busy population. Immense further expenditure is called for to provide equipment to deal with ever-increasing business, and the money will beyond doubt be found. Yet American railroad managers have not even now escaped from the odium incurred by poor lines compelled to extract an exiguous income from a sparse population of struggling pioneers.

¹ Extract from editorial in the eighty-page edition of the *London Times* devoted to a review of American Railways, June 28, 1912.

JAMES J. HILL'S "GREAT ADVENTURE."**THE GREAT NORTHERN AND THE NORTHWEST.**

VALEDICTORY TO THE STOCKHOLDERS ON RETIRING FROM THE CHAIRMANSHIP OF THE BOARD OF DIRECTORS, JULY 1, 1912.

With my resignation today of the chairmanship of the Board of Directors ends my active official participation in the conduct of the Great Northern Railway Company. The work begun nearly forty years ago has been substantially accomplished; though its results have been extended far beyond the foresight of anyone at that time. I hope that I have earned the leisure which every man looks for who has borne the burden and heat of life's day. The property whose fortunes I have directed for so many years has become an organic growth. Its future will be shaped more by the forces that govern the development of the natural resources of the country than by individual initiative. The present is a favorable time for making the change from an active part in the affairs of the company. I will remain a member of the executive committee of the board, and any services it may need from me will always be at its command. But it seems wise to begin the process of adjustment to other hands at this time, when all the outlook is fair and every change may be weighed with deliberation in the light of what is for the best interest of the property. My natural regret in relaxing the closeness of a relation covering the lifetime of a generation and closely interwoven with my own is relieved by the knowledge that the property remains in competent and able hands, and is so well fortified against possible mischance that its future must be as stable as its past.

It seems fitting to give, at this time, to those associated with me in the management of the property, to the many thousands who have invested in it and to such part of the public as may be interested, some brief story of the creation and progress of the Great Northern Railway system as it exists today. This is historically not unimportant as a chapter in the growth of the northwest and of our common country. A record of events still near and vivid in my memory will serve as a note of cheer and a word of farewell.

Nearly forty years ago the thought of a possible railway enterprise in the northwest began to occupy my mind. It was born of experience in northwestern transportation problems that had occupied most of my early business life, of faith in the productive powers and material resources of this part of the country and of railroad conditions at that time. The feverish activity in securing railroad concessions in land and cash that marked the sixth decade of the last century had been followed by collapse. Doomed as these enterprises were to ultimate failure by their lack of commercial foundation and financial soundness, they were suddenly wrecked by the panic of 1873. Aside from the Northern Pacific property, the lines in the State of Minnesota most important and available if converted into real assets for the development of the northwest were the fragments of the old St. Paul & Pacific Company. Following the panic of 1873 these were in the hands of a receiver. The holders of their securities in Holland were more anxious to recover what they could from the wreck than to put more money into its completion and improvements that must be made if the properties were to continue to be operated at all. Their value lay to some extent in what was left of a land grant, which would be valuable as soon as the country should be opened, but chiefly in the possibilities of traffic from the millions of productive acres in the northwest to be opened to settlement by transportation facilities. Yet so great seemed the task and so uncertain the reward, in the general opinion, that any plan of acquiring and reorganizing the property was regarded as visionary in those days by most holders of capital and most men of affairs.

After long and close study of the situation the slender beginning was made on which we risked our all. Failure would be immediate and final disaster. My associates were George Stephen, now Lord Mount Stephen, Donald A. Smith, now Lord Strathcona, and Norman W. Kittson. We bought the defaulted bonds of these properties from the Dutch holders. The agreement with the Dutch committee was executed March 13, 1878, and practically all outstanding indebtedness was subsequently secured. The mortgages were afterwards foreclosed and the property was bought in. For those days it seemed a formidable financial undertaking. The stock of these companies aggregated \$6,500,000, and their bonded indebtedness with past due interest

nearly \$33,000,000, aside from floating obligations. These had to be purchased at prices above those for which they had previously been offered in the open market. The total capitalization and indebtedness at that time of the companies taken over was approximately \$44,000,000.

The property secured consisted of completed lines from St. Paul via St. Anthony to Melrose, a distance of 104 miles, and from Minneapolis to Breckenridge, a distance of 207 miles; and of two projected lines, one from Sauk Rapids to Brainerd and one from Melrose to the Red river at St. Vincent on the international boundary line. On these latter some grading had been done and about 75 miles of track had been laid. There were gaps between Melrose and Barnesville, Crookston and St. Vincent, that must be filled quickly. In themselves, had it not been for the promise of the future, these were scattered tracks in a country just being settled, out of which to construct a railway system and on which to base the financing of their purchase and development.

We advanced the money to build the Red River Valley railroad, fourteen miles of track from Crookston to Fisher's Landing, on the Red river, making a through route by steamboat from that point to Winnipeg. While negotiations were pending and also after they were concluded but before possession could be secured through the foreclosure of mortgages, an immense amount of work had to be done. The extension from Melrose to Barnesville must be pushed, and was carried thirty-three miles, as far as Alexandria; and ninety miles were built in the Red River Valley to reach the Canadian boundary. The former was necessary to save the land grant, whose time limit, already extended, was about to expire. The latter was in addition to connect with a railroad projected by the Canadian government from Winnipeg south. As the properties were still in the hands of a receiver, an order had to be obtained from the court for the completion of the work in Minnesota with funds furnished by us. Money had to be raised to build these lines and to furnish equipment necessary for their operation.

In May, 1879, the St. Paul, Minneapolis & Manitoba Railway Company was organized to take over all these properties, whose bonds had been largely purchased, whose stocks had been secured and whose assets were to be bought in under foreclosure.

It had an authorized capital stock of \$15,000,000, limited by its charter to \$20,000,000, and made two mortgages of \$8,000,000 each. George Stephen was made first president of the company, Richard B. Angus, vice-president, and I was chosen general manager. This placed upon me the practical conduct of the enterprise from its formal inception.

The lines of the new system turned over to our possession on June 23, 1879, comprised a mileage of 667 miles, of which 565 were completed and 102 under construction. From the beginning its business fulfilled the expectations of its founders. The annual report for 1880 showed an increase in earning of 54 per cent, and land sales amounting to \$1,200,000. And now began the long task of building up the country. No sooner was a mile of road finished than the need of building other miles became apparent. Before Minnesota had filled up, the tide of immigration was passing even the famous Red River Valley country and flowing into Dakota. By 1880 it had become necessary to add a line down the Dakota side of the Red river, to plan for many extensions and branches, and two local companies, building lines in western Minnesota, were purchased.

Only a detailed history of the railroad could follow step by step the progress of track extension and the financial arrangements by which capital was furnished for these constant and always growing demands from this time on. In a brief review such as this, I can call attention only to what may fairly be called points of historic interest in the growth of what is now the Great Northern system. One of these was the provision of an eastern outlet by way of the Great Lakes. An interest was obtained in the St. Paul & Duluth Railroad Company in 1881. This, with the building of the link from St. Cloud to Hinckley, gave the necessary access to the Great Lakes, until the organization of the Eastern Minnesota in 1887 as a subsidiary company furnished a permanent outlet and terminals. I was made vice-president of the company November 1, 1881, and on August 21, 1882, succeeded to the presidency, a position whose duties I was to discharge for a quarter of a century. Mr. John S. Kennedy, who had joined our party after the organization of the company, was elected vice-president. At no time have I accepted any salary for my services as president or chairman of the board of directors, since I have felt that I was sufficiently

compensated by the increase in the value of the property in which my interest has always been large.

Business now grew more and more rapidly, the Northern Pacific was about completed, and the Canadian Pacific was building toward the coast. The St. Paul & Pacific Railroad was originally, as its name implied, intended as a transcontinental line. The route to be traversed was rich in fertile soils and abundance of mineral and forest resources. Quite as important, perhaps, was the fact that it admitted of the construction of a line with grades so low and curves so moderate as to make possible cheaper overland carriage than had ever been previously considered. Montana was beginning a large development of her own; while the active growth of the North Pacific Coast, though only in embryo, could be foreseen. In 1887 the lines of the Manitoba were extended to a connection with the Montana Central. This latter company had been incorporated early in January, 1886. Realizing the importance of occupying a field in Montana which was essential to the future transcontinental line, valuable in itself and one which others were already preparing to secure, we had, with some friends, organized the company under the laws of Montana. Work was begun at once, the surveys being made in the coldest winter weather. Construction was rushed. The track was completed to Helena in 1887 and to Butte by the middle of 1888. A branch to Sand Coulee opened up the coal mines of that region, furnishing fuel for use on the Montana and Dakota divisions of the line, and for the development of the mining interests in Montana which had been obliged up to that time to bring in their coal from Wyoming. The work of extending the Manitoba line to connect with the Montana Central launched this company upon the most active period of construction ever known in this country.

Five hundred continuous miles were graded between April and September, 1887, and by November 18, 643 miles of track had been laid, an average rate of construction of $3\frac{1}{4}$ miles for each working day. The annual report for that year said. "The new mileage under construction within the period covered by the fiscal year ending June 30 and the residue of the calendar year 1887 * * * amounts to the relatively large quantity of 1,443.97 miles, or 95.5 per cent of the mileage under operation at

the beginning of the same fiscal year." But this activity on the main line to the west was only one item in the extension programme. In the years between 1882 and 1888 the stone arch bridge and terminals in Minneapolis were completed; the Dakota line down the Red river was finished to a connection with the Canadian Pacific; the Casselton branch was purchased; a line was built from Willmar to Sioux Falls, and afterward extended to Yankton; some railroads in South Dakota were bought; the Montana Central was taken over at cost, and an elevator and large terminals at West Superior were arranged for. In 1889 the line to Duluth and West Superior was completed, giving terminals and dock accommodations which today are not surpassed anywhere in the country. The total mileage operated had now increased to 3,030 miles. The company had also begun to operate its own steamships through the Northern Steamship Company, on the Great Lakes. These boats, which began to run in 1888 and 1889, not only afforded greater dispatch in the carriage of grain and flour from the head of the lakes to Buffalo and other lake ports, but they made the railroad independent of other lake lines. It was thus enabled to protect its patrons, and to prevent its reductions in rates from being absorbed by increases made by the lines east of its lake terminals.

In 1889 the Great Northern Railway Company was organized, to bind into a compact whole the various properties that had grown too large for the charter limitations of the old Manitoba. It leased all the property of the latter company, and was prepared to finance the undertakings about to be completed or in contemplation. By 1893 the line was opened through to Puget Sound. In the next five or six years many improvements were made by relaying track with heavier rails and by changes in equipment and large additions thereto. Branches and feeders were built to round out the system. In 1897 a more direct line from the head of the lakes to the west was created by purchase and construction that completed a road across northern Minnesota to a connection with the main line. The taking over of the Seattle & Montana which, like the Montana Central, had been built by us to assure adequate terminals on the Pacific Coast and to enable construction to go forward from both ends of the line at once, extended the system from Seattle to Vancouver, British Colum-

bia. In 1889 it had entered the ore-producing regions of northern Minnesota that was to give it a large addition to its traffic.

Just as, in the building of the Montana Central and the Seattle & Montana, it was necessary to know thoroughly the country in advance of railroad construction and to act upon that knowledge, so these ore lands in northern Minnesota had to be examined; and some of them it seemed desirable to acquire, with a view to the effect upon the future of the company's business. In January, 1899, I purchased the Wright & Davis property, consisting of a line of railroad, some logging road and a large quantity of ore lands. The purchase for \$4,050,000 was made by me individually. My purpose was to secure the shipments of ore from these properties for the Great Northern; and the profits from the mines, if there were any profits, for the stockholders of the company. The railroad was turned over to the Great Northern at cost. The ore property was transferred at cost to the Lake Superior Company Limited, organized October 20, 1900, to hold in trust, together with other ore interests acquired later. A trust to administer the Great Northern ore properties was formed December 7, 1906, under resolutions adopted by the Great Northern Company. This trust took over the ore interests acquired by me, additional ore lands subsequently secured and other properties. It issued against them 1,500,000 shares of certificates of beneficial interest, which were distributed, share for share, to holders of Great Northern stock at the time. The stockholders were thus put in possession of all the benefits accruing from the whole transaction. At the end of the last fiscal year the trustees had distributed a total of \$7,500,000 to the certificate holders; while the future value of the properties so covered, owing to the quality and accessibility of the ore and the demand of the iron industry for new supplies of raw material, must be very large.

In 1901 the company decided to open negotiations for the joint purchase of the Chicago, Burlington & Quincy System by the Great Northern and the Northern Pacific. These were carried to a successful completion by the issue of joint collateral trust bonds to the amount of \$215,154,000, secured by the stock of the company acquired. Time has confirmed the wisdom of this act, by which through traffic arrangements have been simplified, and the public has gained much by the drawing together of markets

and the quick and cheap distribution of products between Chicago, St. Louis and the Pacific coast.

It was planned, through the formation of the Northern Securities Company, to form a holding concern for the control of these three great properties. The purpose was to prevent a dispersion of securities that might follow where large amounts were held by men well advanced in years, and so to secure the properties against speculative raids by interests at best not directly concerned in the progress of the country served by these lines. This was declared illegal, under the Sherman anti-trust law, by a divided court, upon suit by the United States government, and the Northern Securities Company was dissolved.

In 1907 the subsidiary companies controlled by the Great Northern, including fourteen railway companies operated as a part of it, were purchased and incorporated into the Great Northern system, making of these related parts one homogeneous whole. In the same year I resigned the presidency of the system and became chairman of the board of directors—the office that I lay down today. The work of extension and improvement has gone forward steadily. By the construction of the Spokane, Portland & Seattle line, along the north bank of the Columbia river, the Great Northern and the Northern Pacific obtained jointly entry over their own tracks into Portland. Lines are now being constructed through eastern Oregon that will open up a large and productive country. In 1909 the Burlington obtained control of the Colorado & Southern; so that the Great Northern covers, directly or over the tracks of allied lines, a territory reaching from Chicago, St. Paul, Minneapolis, Duluth and Superior on the east to Puget Sound and Portland on the west, and from Galveston to Vancouver, British Columbia. The Great Northern System has grown from less than 400 miles of the original purchase to 7,407 miles.

I have some pride in the fact that, while constantly increasing both the volume and the efficiency of its service, the Great Northern has at the same time carried to market the products of the country at rates which have greatly developed the territory served by its lines. If the freight and passenger rates in force in 1881 had remained unchanged until 1910, the total revenue collected from both sources for the thirty years would have been

\$1,966,279,194.80. The revenue actually collected was \$698,867,-239.91. The saving to shippers by the rate reductions which this represents was \$1,267,411,954.89, or nearly twice the total amount received by the railroad. The average par value of its outstanding stock and bonds in the hands of the public during the same time was \$155,576,917. Rate reductions in thirty years saved to the public more than eight times the average capitalization. In other words, the railroad could have paid cash for the entire par value of its stocks and bonds in less than every four years out of its earnings. I hope this may be considered a fair division.

The results herein summarized could not have been obtained without the co-operation of a staff of able and devoted assistants, trained to administrative work and grounded in right methods. It was clear to me from the first that the railroad must net more for the money it expended than the returns generally accepted at the time. High efficiency could be achieved only through the work of highly efficient men working with the best appliances. The staff was built up by recognizing intelligence and merit through promotions as vacancies occurred in the company's service, and by establishing throughout a morale that was recognized by employees from the highest to the lowest. The result has been competence and loyalty, physical efficiency and financial success.

FINANCIAL SUMMARY.

I shall give only a short summary of the financing of this great undertaking. The Great Northern was built by the money furnished by its stock and bond holders and with what it earned. As part of the property of the St. Paul & Pacific it obtained some fragments of a land grant in Minnesota to that company. With the proceeds of the sales of these lands nearly \$13,000,000 of bonds were retired and the annual interest charge has been correspondingly reduced. All the other transcontinental lines had received large subsidies in cash or land grants, or both. They suffered the check of financial stresses and passed through receiverships and reorganizations. The Great Northern, which includes the Manitoba, never failed, never passed a dividend, never was financially insecure in any time of panic. For thirty-three years its credit has been unimpaired and its resources equal to any demands upon them; and in times of financial distress it has been able to assist mate-

rially in moving the crops of the northwest. The security of the investments of the holders of stock and bonds has always been a first consideration; and the success and prosperity that attend the company today have not been purchased either by any doubtful transactions in the stock market or at the cost of one dollar ever committed by man or woman to this company in trust.

When we obtained an option on the securities of the old St. Paul & Pacific Company, no individual or financial house in Europe or America, outside of those associated with us, would have taken the bargain off our hands. By a few it was regarded as a doubtful venture, by most as a hopeless mistake. As has been said, obligations aggregating about \$44,000,000 were capitalized at a little over \$31,000,000. The first stock issue was \$15,000,000. The increase of capitalization from that day to this has followed step by step the growth of the property, though falling far below its aggregate cost. Millions of earnings have been used in betterments and new construction that are usually covered by the sale of stock and bonds.

The stock of the St. Paul, Minneapolis & Manitoba was limited by its charter to \$20,000,000. When the Great Northern was organized it took over the charter of the Minneapolis & St. Cloud Railway Company. The capital stock was made \$20,000,000, which was afterwards increased to \$40,000,000, in half common and half preferred. This was further increased to \$45,000,000 in 1893 and to \$75,000,000 in 1898, none of which was issued as common stock, but all made uniform in character and all shares having equal rights. As the addition of mileage, the purchase of many minor companies, the consolidation of all the originally separate corporations into one system, with the exchange of its stock for theirs, and the addition of equipment and betterments required, the capital stock was added to from time to time. In 1899 it became \$99,000,000; in 1901, \$125,000,000; in 1905, \$150,000,000; and in 1906, \$210,000,000, at which figure it stands today. Every dollar of this represents honest value received. But the problems of its issue and disposal, the creation of a market for securities, the safeguarding of it against attack and its maintenance as an investment attractive and secure were difficult and slow of solution. The company has now acquired a standing which nothing in the ordinary course of events can impair.

The issue and placing of bonds was in some respects simpler and in some more complex than the distribution of stock. At the time when the St. Paul, Minneapolis & Manitoba was organized and for many years thereafter the railroad world was governed by a code now done away with. It was the general practice to build new roads with the proceeds of bond issues. The accompanying stock was considered the legitimate property of the promoters, who were accustomed to use part of it as a bonus to the subscribers for bonds. When profits were large, stock dividends were held perfectly proper, and the general practice of railroads was to divide all profits in sight, and charge to capitalization all expenditures that could be so covered. This code and these policies were those not merely of speculators or railroad managers, but were publicly sanctioned both as a part of the necessary conduct of the business and ethically. This difference of standards has to be borne in mind constantly whenever one deals with railroad developments dating much earlier than twenty-five years ago.

During 1878, before the road was organized, 112 miles of track were built, and more than that the year following. A large amount of equipment was bought. To cover this outlay a part of the proceeds of the second mortgage issue of \$8,000,000 was used. There was originally a limit of bond issues to \$12,000 per mile of single track road, which was found to be insufficient even for work mostly on prairie. In 1880 the Dakota Extension mortgage was authorized, of which \$5,676,000 of six per cent bonds were issued from time to time, and this total of less than \$22,000,000 covered the whole bonded indebtedness of the company down to 1883. But it by no means covered the actual expenditures for which bonds might legitimately be issued.

The period from 1879 to 1883, when the railroad was still an experiment in the minds of most eastern capitalists, was not a time to enlarge the volume of securities or ask outside capital to bid for them. All that this could have secured would have been some sales at much below par and an impaired credit. Yet money must be had to keep going the extension which was creating a new northwest; and, through that, a profitable and assured future for the company. So another method was adopted. The company diverted to these uses the money which might have been divided as profits among the stockholders. At one time 210 miles of road were built and \$1,700,000 were spent on equipment without a bond issue. The

company became its own banker while waiting for a favorable market to be created. The stockholders temporarily renounced their profits in order to leave their money in the enterprise. But it remained their money, and their title to it was indisputable. It was costing now very much more than \$12,000 a mile to build a substantial track. In all, about \$11,000,000 of profits were put into new construction and betterments. The stockholder of that day expected these profits to be distributed. His right to them was sanctioned by public opinion as well as by custom and law. It was recognized in 1883.

In that year the credit foundation of the company was broadened and its methods systematized by the authorization of \$50,000,000 consolidated mortgage bonds. Of this amount, \$19,426,000 were reserved to retire prior bonds, \$10,574,000 were to be issued immediately and the remaining \$20,000,000 were to be issued only on the construction thereafter of additional track at the rate of not to exceed \$15,000 per mile, although the cost per mile was often as high as \$25,000, and the cost of terminals added largely to this sum. Of the \$10,574,000 bonds issued on execution of the mortgage, \$10,000,000 were sold to the stockholders at par, payable ten per cent in cash and ninety per cent in the property that had been constructed or acquired with the stockholders' money, thus returning to them \$9,000,000 of the forced loans taken from them by sequestration of \$11,000,000 of their profits during the previous years. To the stockholders the only difference was they received a portion of the legitimate earnings of the company in the shape of bonds instead of cash, and were deprived of the personal use of it during the time that it had been used by the company. The difference to the company was \$2,000,000, or more, as it sold to its stockholders at par bonds which if placed on the market three years before could have been sold only at a heavy discount; besides it was an indispensable aid to immediate growth and a conservation and building up of credit. The difference to the public was not a penny either way.

As branch lines were built or acquired their bonds were guaranteed. In 1887 an issue of \$25,000,000 on lines in Montana was authorized. Some improvement bonds were issued. The extension to the Pacific Coast was financed by the issue of £6,000,000 of mortgage bonds against the extension lines by the Manitoba Company. In 1889 the bonded debt had become \$60,985,000. The Great North-

ern, which now took the place of the other companies, issued collateral trust bonds, which were afterward retired from the proceeds of stock issues in 1898. It assumed the payment of bonds, principal and interest, of the companies taken into the system; and its bonded debt thus became \$125,975,909 in 1908, of which over \$28,000,000 were held as free assets in the company's treasury. Last year the total bonds on the property outstanding in the hands of the public amounted to \$144,331,909.

Of this total, \$35,000,000 were part of the issue of first and re-funding mortgage gold bonds authorized in 1911; which brings us to the final standardization of the company's securities and the act by which it provided against future contingencies. This issue, of \$600,000,000 in all, stands to the big systems of today as the \$50,000,000 issue of consolidated bonds did to the small system of twenty-eight years before. It creates a financial clearing house through which its several outstanding securities may be converted into one of standard form and value; and it forms in addition a reservoir of authorized credit so carefully guarded by the conditions of the mortgage that it cannot be abused or dissipated, yet so ample that it will supply all needs for probably fifty years to come. No private estate in this country is more carefully provided against the future than is the property of the Great Northern Railway Company. All prior mortgages become closed, and more than one-half of the total \$600,000,000 is to be used to redeem bonds issued under them and those issued to buy the company's interest in the Burlington. Nearly \$123,000,000 may be used to cover the cost of other properties acquired or to be acquired; while \$100,000,000 may be issued, at not to exceed \$3,000,000 per annum, to cover the cost of future construction, acquisition and betterments.

The financial outlook of this company is as well assured as that of most governments. It has a provision made now, deliberately and not under any pressure of necessity, for the work of years to come. That provision may be utilized in lean years and held in suspense in fat years, so as always to realize the best prices for securities and to keep the credit of the company unimpaired. No emergency can surprise it. It is financed for a period beyond which it would be fanciful to attempt to provide. And the development of its business throughout every part of the practically half a continent which it serves makes the payment of dividends on the stock as certain as that of its bond coupons. There has never been a

default in either. There has never been a dollar's worth of stock or bonds issued that was not paid for in cash, property or services at its actual cash value at the time. The stock has paid a dividend ever since 1882, and since 1900 the rate has remained steadily at 7 per cent.

The occasion permits no more than this condensed statement, passing in hasty review the fortunes of the railroad enterprise for more than thirty-five years. The first phase of the Great Northern Railway System is ended. The value of the property is founded on the resources of the country it traverses. From the head of the lakes to Puget Sound this is rich agricultural land. From fifty to one hundred miles of the line run through mountain valleys, but even these are susceptible of cultivation. Barring only the actual summits of the mountain passes, the country is capable, under the best modern agricultural treatment, of multiplying its wealth indefinitely and furnishing increasing and profitable tonnage for years to come. The Great Northern is now wrought so firmly into the economic as well as the corporate body of the land as to have fitted itself permanently into the natural frame of things. So far as any creation of human effort can be made, it will be proof against the attacks of time.

Not lightly may the relation between a man and the work in which he has had a vital part be set aside. My personal interest in the Great Northern remains as keen as ever. The financial interest of myself and family in it is larger now than it ever was at any time in the past and any change would more probably increase than diminish it. While I shall be no longer the responsible head of the Great Northern, I will contribute henceforth such counsel and advice as may seem best from one no longer holding the throttle valve or controlling the brake.

Most men who have really lived have had, in some shape, their great adventure. This railway is mine. I feel that a labor and a service so called into being, touching at so many points the lives of so many millions with its ability to serve the country, and its firmly established credit and reputation, will be the best evidence of its permanent value and that it no longer depends upon the life or labor of any single individual.

JAMES J. HILL.

July 1, 1912.

AS OTHERS SEE US.¹

THE RAILWAYS IN THE UNITED STATES.

BY C. COLSON, MEMBER OF THE INSTITUTE, INSPECTOR-GENERAL OF
BRIDGES AND ROADS, COUNCILLOR OF STATE, OF FRANCE.

Oh wad some power the giftie gie us
To see oursel's as ithers see us!
It wad frae monie a blunder free us,
And foolish notion.
—ROBERT BURNS.

For a long time we have not given the readers of the *Revue* any information about the situation on the railways of the United States. There is, however, no country where their functions are of greater importance and where the questions relating to them are more discussed, present themselves under more curious aspects, or excite greater differences of opinion.

The vast growth of the railways in the United States is perhaps the greatest and most fruitful industrial work in the history of humanity. The total area of the Union (not including Alaska and the colonies) is 3,011,700 square miles, being not much less than that of Europe, which amounts to about 3,938,400 square miles. But its population did not exceed ninety-two millions in 1910, as against four hundred and fifty-three millions in Europe; and thirty-five years ago, it only attained half its present figure. On the other hand, at the end of 1910, the railway system had a total length of 242,350 miles, while the whole of Europe only contains about 217,500 miles of railways. One can say that colonization has followed the railway, has penetrated with it this immense continent where no ways previously existed, except several large rivers. Before the railways became developed, attempts were made to extend the inland waterways by constructing many canals, but inland navigation gradually died out (except on the great lakes, where it has a quasi maritime character, and on some exceptionally-placed waterways), as soon as a better system of transport became known. It

¹From *Revue politique et parlementaire*, as translated for the Bulletin of the International Railway Congress.

was the railway which made it possible to develop with unexampled rapidity this great continent, to develop farms whose produce, sent to the Old World at very low prices, there produced the agricultural crisis of thirty years ago. Then it helped to extend a population there which will very soon consume all the produce of its own country, so that its growth is an important factor in the general rise in prices, which is now producing with us a crisis in an inverse sense of the former one, namely, the dearness of food. Finally, the railways, which carried coal and minerals at rates even lower than those charged for cereals, helped to give the United States an industrial development, the general growth and magnitude of which are just as surprising as the former development of farming.

In spite of the smaller population, the total receipts of the American railways during the last year for which statistics have been issued (July 1, 1909 to June 30, 1910) amounted to \$2,750 millions a figure practically equal to the total receipts of the European railways during the same period, although the official statistics include a smaller proportion of accessory receipts in the United States, about \$58 millions instead of \$155 millions. Naturally, passengers represent a smaller fraction of the total, as the population is smaller. The total passenger mileage was 32,312,000 miles as against 10,564,000 miles in France for 39.5 million of inhabitants and 22,059,000 miles in Germany for 65 million inhabitants; but as the fares are very high in America (mean 1.938c per mile as against 1.082c in France and .913c in Germany), they yielded \$633,070,000 while the total for the whole of Europe was \$869 millions. Goods, owing to the enormous distances, gave a total of 327 million ton-kilometres² (199,983,000,000 English ton-miles), as against 18,455,000,000 English ton-miles in France, and 30,578,000,000 English ton-miles in Germany. In considering these figures, let us remember that the output of coal, which is the essential factor in all the big industries, was only 38 million tons in France, while it amounted in 1910 to 222 million tons in Germany and to 452 million tons in the United States. In order to make possible the long-distance traffic usual in America, very low rates are necessary. The mean rate per metric ton and per kilometre is 2.67 centimes, as against 4.27 centimes in France and 4.41 centimes in Germany. Nevertheless, the total receipts from goods amounted to \$2,250 millions.³

² M. Colson undoubtedly here wrote milliiards—a thousand millions.

³ The total receipts from freight in 1910 were \$1,925 millions.

It must also not be forgotten that the railway receipts do not represent the total amounts paid by the public for conveyance in the United States. The companies provide carriages of one class only for passengers, and any better accommodation is supplied, at an extra charge, by the Pullman Company, whose receipts amounted to about \$34 millions. The parcels service is organized by express companies, which in 1909-1910 received about \$289 millions; of this, they only paid 720 million francs (\$138,900,000) to the railway companies for the carriage of the parcels.⁴

The working expenses in 1909-1910 amounted to \$1,822,630,000 corresponding to a co-efficient of working of 66 per cent. This is a little lower than the 67 per cent of Germany, and one-tenth higher than the 60 per cent of France, which is the lowest in Europe. Thus, the American railways reduce their expenses to something the same proportion as the countries in western Europe, although their goods rates are hardly more than half those existing in the Old World; and the goods traffic supplies more than three quarters of their receipts. This is due to the fact that their traffic consists chiefly of large lots, carried over long distances frequently attaining 1,000 or 1,500 kilometres (621 or 932 miles); and hence they were able to adapt their tracks and their rolling stock to this special class of work. In Europe, civilization developed before the period of easy transport, so that production had to be organized in such a way that each district should, as far as possible, supply itself; while in America farming and industries started nearly everywhere simultaneously with the railways. Each district could devote itself to producing those articles for which its soil, its subsoil and its climate rendered it most suitable, the facility of long-distance exchanges thus making it possible to subdivide the work among the different parts of the territory. Accordingly, the long-distance train-load traffic forms a much greater proportion of the total traffic than in the Old World. Thus the mean mileage of the goods, which in France certainly does not attain 93 miles, even if we count as one the goods going over several different railways, amounts to 248 miles in the United States, and the mean train-load is 345 metric tons, instead of 146. Trains in which the gross load hauled amounts to 3,000 tons, are not rare in the United States, while in France the gross load hardly exceeds 1,000 tons, and the proportion of the

⁴In 1909-10 the receipts of the express companies were \$146,116,315 of which the railways received only \$67,190,922.

traffic, for which heavier trains could be utilized, is not large enough to make it advisable to make our lines and our rolling stock suit such traffic. In Europe, 10-ton wagons are still the rule, 20-ton wagons are exceptional and 40-ton wagons are very rare. In the United States, out of 2,400,000 wagons, there are only 12,000 which take less than 18 tons, and most can take 18 to 33 tons; 634,000 can take 33 tons and 390,000 can take 42 to 54 tons. These working conditions which have resulted from the historical development of American farming and industries, make it possible to have very low rates and still work at a profit, but the great rapidity of this development and its wonderful adaptation to modern requirements are due to the initiative of the American companies and to the freedom of action which they long enjoyed.

It was under a system of perfect and untrammelled freedom that the American railways were established. The concessions in perpetuity form real property and the charters granting them provided neither for any organized control, nor for regular and published tariffs; they did not even fix, as a rule, the maximum rates which could be charged. On the other hand, the companies only very rarely received any financial assistance. The only subventions they received were grants of free land situated along the line, alternately to the right and to the left of it, in the districts which were as yet unoccupied. These grants of land were not a negligible quantity, for they amounted altogether to about 123,557,000 acres (nearly the area of France), and the sale of such land, when the railway attracted colonists, materially assisted the construction of further lines. But it cannot be said that the public authorities expended anything, as that land owed its value, which moreover for a long time remained very low, to the railway developed in this way.

At the start the Americans, like the English, put their trust in competition, for ensuring a good service to the public at reasonable rates. Such competition did in fact arise, as soon as sundry lines converged towards the large centers; and it materially contributed towards the lowering of the rates. It is partly due to this competition, but still more to the need of very low rates in order to make it possible to export cereals, timber, etc., and finally to the growth of the traffic in heavy goods carried at the lowest rates (coal, minerals), that the mean rate per ton-mile became reduced from 2.04 cents in 1872, to .806 cents in 1899.

But competition does not procure for the public, generally and permanently, the lowest prices compatible with the net cost of an article or of a service, except in industries where that competition is itself general and permanent. Now it is in the very nature of railways that competition is always exceptional and only lasts a short time. The railway industry presents, to an extent unknown in any other industry, the conditions which partly exist in some other industries, and there produce trusts or combines capable of restricting competition and of sometimes producing almost a monopoly. These conditions are met with when an industry requires such an equipment or a quantity of appliances that it is impossible to start it without locking up a large amount of capital, and when at the same time once that capital has been expended, it becomes possible materially to increase the output of goods or of services without increasing expenditure in the same proportion. It is self-evident that such conditions exist in a very high state of development in the organization of railway traffic. At the start, it is necessary to build a very expensive track, and subsequently, it is possible to multiply the trains running on that track without increasing the capital outlay proportionately.

That being the state of affairs, competition never exists in the case of carriage between smaller places where there is but one railway line, and the American railways have always kept the rates very high for this traffic, sometimes as high as the cartage rates, as high as 10.85 cents per ton-mile. On the other hand, very brisk competition started, between large centers, at the moment a new company began to cater, by a different route, for traffic carried till then by an existing railway, and then the rates charged for the traffic competed for could be reduced to the very low figure necessary for covering, not the whole working expenses, but the small additional expenditure involved in carrying supplementary traffic on a line on which a regular service anyhow exists. When competition was active, the American companies sometimes went the length of not even covering this additional expenditure, so as to ruin a competitor, and rates fell to 2 centimes, to 1 centime, even to less in the case of long distances. Then the more powerful line absorbed the other, or else the two rivals recognized that such strife would ruin them and they came to an agreement to divide the traffic; the high rates then reappeared until the breaking

of the agreement or the opening of a third line again started a period of strife, soon ended by a similar temporary agreement.

These fights sometimes had deplorable consequences for the American railways; from 1876 to 1890, on the average 3,728 miles of line became bankrupt per year, involving a total capital of more than \$193 millions. After the great slump of 1893, the receivers were operating 41,000 miles, nearly one-quarter of the total railway system.

The public also suffered from this state of affairs, in the first place, owing to the inequality between the rates charged at centers where competition was operative and at those where it was not, secondly and above all owing to the sudden jumps, which sometimes occurred; rates jumped up to ten times their previous figure, and vice versa, within a few days, according as agreements between companies were made or broken. The want of steadiness in the rates is perhaps still more prejudicial to business than high rates, as it makes futile all calculations on which engagements are based. Moreover, large dealers, more capable than others of urging their interests with the different railway companies, obtained secret rebates which sometimes made all competition with them impossible. The exclusive advantages from private agreements are one of the causes of the improper development of the trusts which form almost monopolies in the United States.

Hence it became felt that it was necessary to exercise a control over the operation of the companies. Although the charters granting the companies the powers necessary for building the railways did not organize such a control, they mentioned that in accordance with common law, these companies are bound, as common carriers, by all laws bearing on the matter. The control which common law thus makes it possible to institute by means of the legislature, without fixing its scope in a contract as is the case in France, can go so far as to fix a maximum for the rates. There would be a risk of its assuming very improper proportions, were it not limited by the protection which the federal constitution gives to all its citizens.

We know that the legislature, in the United States, has not that omnipotence which, in England, makes it nearly as powerful as manners, enabling it to do anything, as an old proverb says, except change a man into a woman. The Supreme Court can set aside any legal decision tending to apply a law, made by a State or even by Congress, which is unconstitutional. Now the constitution is not

limited to regulating the proceedings of the public authorities. It contains, among other things, the essential provisions which form in France the declaration of the rights of the man and the citizen, in particular those which protect individual liberty and property. The Supreme Court thus can stop the application of any law resulting in the total or partial confiscation of any property, and it is by using this right that it has protected the property legally inherent in railways against the improper attacks which would have resulted from certain measures issued under the guise of controls.

Besides the complication resulting from the relations between the administrative authorities and the legal authorities, there is another which arises from the fact that the home traffic of each State is entirely under the control of the legislature of that State, while the traffic between the different States is under the sole control of the federal authority. The charters for the railways were granted, with very few exceptions, by each State for its own territory; they are under the jurisdiction of the laws of that State as regards the traffic which does not go beyond the limits of that State. But the development of modern conditions has brought it about that all railways participate in traffic from one State to another, and hence all are, for this very reason, subjected to any control instituted by Congress. The laws thus issued by different authorities may give rise to contradictions, which have to be settled by the Supreme Court. The latter has a tendency to increase the field of action of the federal authority more and more. By a recent decision ⁶ which will have a considerable effect if that court confirm it, and which has much excited the State governors, a federal court of appeal has decided that a State cannot enact any measures, even if solely applicable to its home traffic, which would as a matter of fact react on the interstate commerce.

The first laws having the object of organizing a control of the railways were passed by sundry States about forty years ago. They were brought about by the dissatisfaction which arose among the grangers, in consequence of the low prices which ensued when the west became colonized, until the export of wheat to Europe became developed; thus, the chief object aimed at was a general reduction in the rates charged for carriage. Controlling commissions were

⁶ The Minnesota rate case, since decided by the Supreme Court (June 9, 1913), sustaining state regulating power until federal government specifically supplants it.

appointed in many of the States. Those of the older States, near the coast, as a rule, only received very limited powers, and exercised a good influence on the tariffs which they merely tried to make uniform. The new States in the west gave their commissions very extensive powers or enacted laws which directly reduced the rates very considerably. Some of these laws were set aside by the Supreme Court; others led to a sudden stoppage of railway development in the States in which the remuneration of the capital already expended became too low, and the legislatures of those States had to modify those laws in order to attract colonization which was avoiding them.

The federal authority intervened for the first time in 1887, passing a law known as the Reagan act. This contained several provisions about tariffs and in order to enforce them, it instituted a commission called the Interstate Commerce Commission, consisting of five members of whom not more than three could belong to the same political party. This law was supplemented and modified on several occasions, the last time in 1910. This commission now consists of seven members and of a numerous staff under them. Penalties consisting of enormous fines or even of imprisonment can be inflicted in case of breaches of the law. The powers of the commission extend to tariffs, to the organization of through services, to safety measures and to the working hours of employees. The commission compiles and publishes railway statistics and may compel the companies to keep their accounts in certain defined ways. Finally, its jurisdiction has been extended to express companies and sleeping-car companies, to telegraphs, telephones, submarine cables, pipe lines, etc.

The chief tendency of the action of the federal authority is to abolish special agreements, arbitrary unequal treatment and discriminations which do not correspond with differences in the traffic conditions or the geographical positions. But by a singular survival of antiquated ideas, the legislature, while trying to abolish inequalities, continues to keep up their cause, by preventing the companies from stopping competition by agreements. The campaign against the trusts, led by President Roosevelt, in which just complaints are mingled with violent appeals to demagogic passions, has resulted in applying to railways a legislation which the very nature of things makes inapplicable. In vain the Interstate Commerce Commission, which can certainly not be suspected of a bias

in favor of the companies, drew attention to the fact that competition was the source of all the irregularities and inequalities of treatment, and that efficacious control was the sole real remedy to the abuses of a monopoly which was bound to come. In vain President Taft, who pursued the trusts with such energy, proposed to insert in the last law concerning railways, a clause authorizing the companies to make properly controlled agreements. Congress did not venture to enact a provision which all experts, whether friendly or hostile to the companies, recognized as necessary.

Federal legislation has, however, contributed a great deal towards the unification of the working of railways, by compelling the companies to publish their rates, to apply them strictly, and not to alter them without giving previous notice to the public. It put an end to sundry crying abuses, by formally prohibiting any issue of tickets, passes, orders for reduced rates, to anybody except railway employees or in the interest of charities. How desirable it would be for such a measure (which after all would only mean a strict application of the tariffs) to be enforced in France and so put an end to a cause of real demoralization. The law which prohibits secret rebates at the same time enables the companies to compel the public to respect their tariffs, as it enacts severe penalties for the makers of false declarations. It has thus put an end to preferential treatment taking the form of free passes or of tolerance of false declarations serving as basis in calculating the rates.

But it seems that the Interstate Commerce Commission would have been unable to fight against the rebates resulting from competition, if the latter had not been stopped by agreements made in spite of the legislature. Experience had taught the older companies that competition only caused them loss, and the appearance of new companies has become rarer owing to the magnitude of the existing railway system. Agreements were already made long ago: in the first place, in the form of pools (agreements for the division either of traffic, or of receipts), then in the form of trusts (formation of special companies which held controlling interests in several railway companies), finally, by actual amalgamations brought about by the purchase of all the stock of one company by another company. When the government, by applying to the railways the Sherman Act of 1890 which prohibits, under severe penalties, any agreements restraining competition, no longer allowed them to adopt any of these methods, the inevitable monopoly was re-established by per-

sonal agreements, resulting either from the collection of a large number of shares of each of the companies serving a given district, in the hands of one single financier (Harriman, Hill, Gould, Vanderbilt, etc.), or by having the president of one company also on the board of several other companies (Cassatt, president of the Pennsylvania). The *de facto* agreements resulting from these combinations, which the law cannot prohibit without interfering in all the affairs of a business man's life, have enabled the railways to abolish the secret rebates to large traders, rebates which were even more injurious to themselves than to the public. In spite of the resistance of powerful corporations, for instance the steel trust, this abuse has nearly entirely disappeared.

But the Interstate Commerce Commission, which like every human institution tried to extend its powers, wanted to go further and instead of limiting itself to ensuring the application of the regularly published tariffs, it tried to intervene in the making of those tariffs by exercising a right resembling the right of confirmation reserved in France to the minister of public works. The law enunciates certain rules for preventing differences in rates which result from the published tariffs, but which favor one locality at the expense of another. It had given the Interstate Commerce Commission power to stop injustices of this kind, which could have given rise to complaints. But at the beginning, when the companies did not willingly obey the injunctions of the commission, these only became executory when the federal courts had decided the matter; the latter had first to examine whether these injunctions were correct in law and properly founded on fact. In the somewhat numerous actions-at-law that ensued, the companies rather often won their case, for they took care only to fight when they knew their cause was good. The commission was rather impatient under these legal checks, and by its annual reports led the way to a whole series of legal changes, which little by little considerably increased its authority.

In the first place, it acquired the right of no longer limiting itself to the prohibition of a tariff which it considered unjust, but of fixing the rates which were to be substituted for it, by means of an order which was executory for the time being, unless it was set aside by the courts after inquiry. It urged with reason that the maintenance of an unjust rate, during long legal proceedings, causes an injury to commerce, which cannot possibly be made good. When

it is a question of raising rates, the law goes further and does not allow these to come into force before they have been authorized by the Interstate Commerce Commission, the company having to prove that the increase is fair and reasonable. The powers of the commission, for ensuring the continuity of the services over different railway systems and for fixing through rates, have been considerably widened. Finally, its powers of granting indemnities to victims of improper treatment have also been increased.

But in all cases, its decisions are liable to appeal before the legal tribunals. In order to ensure rapidity and uniformity in the decisions, the 1910 act instituted an Interstate Court,⁶ before which, instead of the ordinary federal courts, all actions have to be brought; subject of course to appeal to the Supreme Court of the United States. The former president of the commission is now president of this special court. However differences of opinion are already beginning to arise between the two bodies, and in its last report, the commission renews its complaints against the legal control, and warmly criticizes the restrictions to which the execution of some of its decisions has been subjected.

The commission, which formerly could not act until a complaint had been lodged, can now intervene to stop abuses found to exist by inquiries made spontaneously. But it continues only to issue its injunctions against a given definite rate and is not able to compel a company to modify its rating system as a whole. It is striving to increase its powers in this direction and thinks that a law should be made to give it, for instance, the power of uniform classification of goods as a basis for the general tariff of the different railways catering for one and the same district, and so bring about an improvement long aimed at, but not yet obtained, as the companies concerned have not yet come to the agreement necessary. It would, however, be a great mistake to think that the commission fails to recognize the commercial needs which make certain inequalities of rates necessary. We find a striking instance of its readiness to recognize the consequences of geographical position, even if it appears opposed to certain prejudices, in the rules which it applies relating to intermediate stations and combined rates.

The interstate commerce law prescribes that in these cases the principles should obtain which administrative practice adopted in

⁶ The Commerce Court.

France long ago, namely: first, that the rate paid for an intermediate distance can never be greater than the rate fixed for the longer distance in which the intermediate distance is included; second, that the rate paid for a whole distance can never be greater than the sum of the rates for the different fractions of that distance. But the law specifies that derogations from these rules can be authorized by the commission. Now the latter admits without hesitation that when a reduction for a whole distance is made necessary by competition, it is not just and reasonable to prevent the charging of higher rates on intermediate distances where the same competition does not come into play. For instance, if a company fixes a rate between two terminals which it connects by a circuitous route, which rate is equal to the rate charged for another more direct route, the reduction this involves cannot be held to affect the rates between the intermediate stations on the longer route. Similarly, the comparatively low rates necessary for retaining the traffic between New York and San Francisco, which can go by sea (via Cape Horn, or with transshipment via the Panama isthmus) must not prevent the railways from charging higher rates between inland cities, seeing that they are driven to accept such rates for the whole distance. The commission does not consider a difference of rates undue preference, if that difference simply allows for the natural advantages of certain towns owing to their geographical position on the seaboard.

But if the companies, in order not to have Chicago, for instance, in an inferior position relatively to New York, grants Chicago the same rates to San Francisco, the other inland towns near the Pacific coast can demand, for their relations with Chicago, rates which are based on those between that town and San Francisco, as the latter did not result, as in the case of New York, from a situation which compelled the railway to grant them, but were granted voluntarily. It is with regard to the way in which the maximum increases allowable in cases of intermediate distances are to be determined, that the commission is at present in conflict with the Interstate Court, as the latter has set aside a decision which fixed the maximum by means of formulae applicable to vast distances, and which had a wording which seemed, by its generality, to go beyond the powers of the commission.

The latter similarly admits that if a rate for a given distance is reduced excessively in consequence of a measure which affects the

railway but of which it is not the author (for instance by the effect of competition, or of a local law prescribing an unreasonable lowering inside a State), the companies are not bound to use this for a combined rate and can accordingly charge, for a total distance which includes the distance in question, a rate higher than the sum of the rates for the fractional distances.

One sees that in the cases in which the commission has a discretionary power, it knows how to allow for circumstances which make it impossible to retain traffic on certain lines, except if special rates are charged which if charged generally would prevent the capital invested in railways from receiving any return. Its action, combined with the agreements which have nearly eliminated competition between railways, has made the most of the inequalities, formerly justly criticized, disappear. At present, it is devoting its attention chiefly to the question of the general height of the rates.

For a long time, individual local legislatures had tried to bring about reductions in the rates, the reason assigned being not a comparison of different rates, but the excessive height of rates generally. We have mentioned the former agitation among the grangers, which was stopped in the first place by the experience of the evil effects of any measure reducing the yield of railways, at a time when their development was the most pressing want of the country, and which subsequently completely died out when the exporting of wheat took its full development, thanks to the reductions which the railways made spontaneously in the rates wherever this was really necessary for the development of the traffic.

During the last few years, the passenger fares have been the chief object aimed at. In many States there was a desire of fixing as a maximum the rate of 2 cents per mile, which is practically equal to the mean rate which then resulted from a general rate normally amounting to 3 cents per mile, and from the reduced rates granted for season tickets, circular tickets, excursions, etc. Numerous conflicts arose, in this connection, between the State courts, which nearly everywhere inflicted the penalties fixed for charging rates exceeding the maximum fixed by the local legislature on the local controlling commission; and the federal courts, which ordered that all coercive measures should be stopped until the Supreme Court had decided the appeals made in order to have any reduction in the rates charged by the companies declared null and void, as contrary to the Constitution, on the plea that the reduction could be consid-

ered as equivalent to a confiscation of their property. The Supreme Court has, moreover, upheld the right of the federal courts to oppose any measures having the effect of unduly depriving a citizen of his property, but drew attention to the need of using great discretion in exercising this right. As regards many of the points, the disputes have been ended by a compromise between the companies and the authorities of the States, fixing the general rates for passengers at 2.2 cents per mile.

The Interstate Commerce Commission was led to consider, in its turn, the general state of the rates, in consequence of the attempts of the railway companies to raise their rates as their working expenses had increased considerably. Both in America and in Europe that increase results from the rise in the prices of most products, which has during the last fifteen years succeeded the marked drop in the previous period, and above all from the quicker rise in the rates of pay. These have been rising nearly continuously, but with a very varying speed, during the last three quarters of a century.

A first attempt to raise rates was made in 1900, after the agreements had been made which eliminated nearly all competition between railways. The mean rate per ton-kilometre, which had fallen to 7.24 mills per English ton-mile in 1899, gradually increased to 7.80 m. in 1904, partly in consequence of a few increases in the rates, partly because there was less traffic in the raw materials carried at very low rates, the result of industrial stagnation, partly, finally, because certain older rates from terminal to terminal were no longer in force except for the most direct route between two towns connected by two routes, as the agreements made it possible to send all traffic by the shorter route. But the boom which subsequently started with extraordinary intensity made former complaints forgotten, while at the same time it reduced the mean rate to 7.57 m. per English ton-mile, as the composition of the traffic was modified in a direction inverse to that of former years. From 1905 to 1907 (financial years ending June 30) the gross receipts of the railways rose to 10,800 million francs,⁷ that is, by 11 per cent per year, and in spite of the increase in expenses, the net profit increased from 3,580 to 4,350 million francs (\$691,880,000 to \$840 millions).

The only thing which public opinion then demanded of companies was that they should equip themselves so as to be able to deal with the traffic, the superabundance of which had resulted in troubles

⁷ Gross receipts in 1907 were 13,415 million francs or \$2,589,000,000.

exceeding those which gave rise to such bitter complaints in Europe. It was at this moment that Mr. Hill estimated at \$5 billion the sum which would have to be spent during the next few years in order to enable the tracks and rolling stock to meet all requirements, and nobody thought of discussing the profits of railways at the moment at which such an unlikely appeal for capital was being considered by the chiefs of that industry; and the latter, on the other hand, no longer thought of raising the rates.

But the violent slump which came at the end of 1907 suddenly changed the situation. The gross receipts decreased in 1908 by \$388 millions, dropping to \$2,216 millions, and the net profit was reduced to \$729 millions. Yet the companies had made every effort to reduce their expenses; the number of employees amounting to 1,650,000 on June 30, 1907,^s only amounted to 1,436,000 on June 30, 1908. But the works which had been begun had to be carried out, although they had become less urgent. In America even more than in Germany and in France, experience had shown that the time had arrived when it was necessary to increase the traffic capacity of the railways materially, if one did not wish to have more and more serious troubles whenever business improved. In order to remunerate their quickly growing capital, the companies resolved to raise the rates, this time seriously, and the agreements between them enabled them to combine them in such a way that no displacement of traffic resulted.

The public, for which the slump had already been a severe trial, was much excited by the announcement that rates were going to be raised. Existing law gave the government no power to oppose this directly. But taking as basis the agreement previously made, it started actions against the companies for violating the Sherman Act (the 1890 act against the trusts) which prohibited any agreement tending to restrain trade. In order to stop these actions, the companies agreed to postpone the application of the new tariffs until the new law which was being prepared had given the Interstate Commerce Commission the right of opposing any increase which it did not consider justified. By common agreement, the passing of the new law was accelerated; this in 1910 modified the law relating to interstate traffic and contained this clause.

^s The official statistics give the figure of 1,672,000, but they include the employees of companies which carry out certain accessory services; these companies do not figure in the 1908 returns, and hence their employees must be deducted from the 1907 returns in order to make the comparison correct. —(Author's Note.)

The first task of the commission, once this act had been passed, accordingly was to examine the increases proposed, and it was generally thought that the commission would accept them in part. But just as the slump had started sooner than had been expected, so the recovery was quicker than usual. We saw that in 1909-1910 the gross receipts increased to \$2,750 millions and the net profit to \$928 millions, both figures exceeding those for 1907. In spite of the material increase in the capital, the situation had again become very satisfactory and the commission decided that under these conditions the increase in the rates was not justified. The companies did not think that they could dispute this decision and the project of raising the rates was temporarily abandoned.

But the companies do not seem to have given it up definitely, for at the beginning of 1911 the growth of the traffic stopped, while the expenses continued to grow. For the whole financial year 1910-1911, the provisional accounts show an increase of \$31 millions in the receipts and of more than \$87 millions in the expenses, thus giving a reduction of about \$58 millions in the net profit. The first eight months of 1911-1912 only gave an increase of \$13 millions, mainly absorbed by more than \$9 millions of new expenses.

The increase in the working expenses depends above all on the increase in the pay. According to statistics drawn up by the Interstate Commerce Commission, this increase amounted to 7.4 per cent in 1909-1910 as compared with 1908-1909, and to 4.3 per cent in 1910-1911 as compared with the preceding year. The number of employees, which increased by 66,000 in 1908-1909 and by 177,000 in 1909-1910, was reduced, it is true, by about 31,000 in 1910-1911; but this did not counterbalance it. Every time the companies had any serious dispute with their employees, they took as arbitrator a member of the Interstate Commerce Commission, hoping that the commission would be compelled to admit that the increased expenditure which its members recognized as necessary in their capacity of arbitrators, would justify increases in the rates; but this policy has not yet met with any success.

In order to determine whether the existing rates, taking them altogether, are too high or not, the commission always adopted the principle of working out the rate of remuneration of the capital invested in the railways. Now in order to ascertain what this capital amounts to, there is at present no basis except the nominal value of the stock issued, which certainly differs from the amount act-

ually expended. It is in order to ascertain the true revenue of the capital expended on the construction of the railways that the commission obtained extensive powers to control their method of keeping accounts. It had asked that a clause should be inserted in the act of 1910, prescribing that the capital of the railways should be ascertained, and also another clause placing the issue of the shares under government control; this was replaced by the appointment of a commission which was to study the question. This commission has, moreover, expressed the opinion, after careful investigation, that any intervention of the public authorities in this matter would present many more disadvantages than advantages.

The nominal value of the stock on June 30, 1910, amounted to \$8,113 millions of shares and to \$10,303 millions of bonds, or a total of \$18,417 millions. But this total includes \$4,041 millions of shares of certain companies belonging to other railway companies, shares whose cost to the purchasing company is naturally represented by other shares issued by that company. Hence this must be deducted from the total or else it would appear twice; this reduces the capital to \$14,338 millions. This figure includes sums devoted to enterprises other than railways, which according to the statistics of previous years amounted to between \$193 millions and \$231 millions, while the 1909-1910 statistics only give them as \$38 millions. The difference depends on the fact that several of the companies which formerly gave an estimate of what fraction of their capital had been spent in that way, declared that they were unable to certify that this estimate was at all correct, even approximately so.

The net profit drawn by the companies who owned shares amounted in 1909-1910 to \$77 millions.⁹ Adding this to the \$928 millions of net revenue, we obtain a total of \$1,005 millions, representing about 7 per cent on the nominal value of the stock issued to the public. But does the nominal value of that stock really represent the capital expended on the railways? That is the question.

It has often been said that the amount of the nominal capital was considerably increased by stock watering, by issuing stock not really

⁹ Surplus of dividends and interest on stock of all kinds owned by the railway companies, over the sums paid by those companies, on account of dividends and interest of stock owned by other railway companies. The sums to be added to the net profits of working or to be deducted therefrom are shown in the statistics in different forms out of which it is difficult to make a choice.

representing capital spent on works, but profits obtained by business men promoting, buying up or amalgamating companies. But the history of the railways does not show anything in this respect which can at all compare with the creation of the large masses of shares which represent imaginary extra values or commissions which has characterized the promotion of enterprises such as the Ocean trust. On the contrary, the many bankruptcies and the buying up at low prices of lines which had become bankrupt have formerly made enormous sums disappear from the accounts. Taking it altogether, the stock probably represents a sum considerably less than the real capital.

Evidence in favor of this view is given by the low capitalization per mile, which only amounts to \$62,657 per mile in the United States, while it amounts (main railroads) to \$119,100 per mile in Germany (cost of buying up paid by the present holders plus subsequent capital expenditure), to \$150,625 per mile in France (same basis), and to \$223,375 per mile in England (actual amounts obtained by the issue of shares, after due deduction for duplicated amounts). Now the mean traffic on each mile in the United States (217,000 passengers and 1,564,000 tons of slow freight) is comparable with that in France (677,000 passengers and 887,000 tons of slow freight) and with that in Germany (967,000 passengers and 1,370,000 tons of slow freight); France in addition has much more quick-freight traffic than the other countries. On the other hand, the capital of the American railway companies includes large sums devoted to non-railway enterprises, for which there is no equivalent in France or in Germany.¹⁰ The enormous difference in the sums given as the capitalization per kilometre hence leads us to think that the amount is reduced rather than increased in the United States.

The capital outlay was certainly much reduced by the fact that while in Europe (particularly in England) land was already very

¹⁰ The height of the total net profits is due more particularly to the possession of stock of numerous enterprises, for instance of mines. The Interstate Commerce Act of 1906 has much increased this amount, by prohibiting the companies from carrying industrial products belonging to them, beyond the needs of their own services. This clause was intended in order to stop the advantages that the coal mines worked by many of them obtained, as compared with other mines, from this community of interests. The Supreme Court decided that the obligation of selling, at whatever price, properties legally acquired (this would have been the normal result of the application of the new law), would have a confiscatory character, and the sole effect of the Act is the creation of subsidiary companies which have taken over the mines, and part of these shares the railway companies hold.

dear when the railways were built; not only did the land in the United States cost nothing in many cases, but even in the case of certain lines, the sale of land received as a gift from the public authorities covered part of the expenditure. The portion of the railway system constructed in flat and easy country is not greater in the United States than in Germany. It is true that many of the lines were built at the start very cheaply; they occupied or crossed at a level the public highways, they had no fencing, they had elementary stations and signals. But gradually as traffic grew, it became necessary to reconstruct most of the lines in populous districts and many have been made, at great expense, quite equal to ours.

The cost of a considerable part of the improvements has, however, been included in the annual expenses, and met out of receipts, instead of being added to capital account. That is a practice which the Interstate Commerce Commission has occasionally criticized, as a way of justifying unduly high rates by increasing the working expenses, by adding to them expenses of quite a different nature. As a matter of fact, reserves used as working capital and improvement of the equipment by sums taken from the receipts is a practice frequently adopted in all agricultural or industrial enterprises which are properly conducted, and although it is as well to discriminate between different classes of expenses in the interests of lucidity of accounts, one can but praise the habit of immediately amortizing part of the additional equipment, by taking it out of the profits. That is even an absolutely indispensable practice when the companies have, as in America, perpetual concessions, where shares accordingly do not have to be amortized at a regular rate in a definite period of time. If this were not done, one would indefinitely increase the loans raised for obtaining an equipment of which sometimes one part, sometimes another, would be made useless by progress in the industrial arts and by changes in the currents of traffic. It is the prudence exercised in not unduly inflating their capital for the carrying out of supplementary works, to which the American companies, just like the Prussian State Railway, owe their excellent present financial position, while the contrary habit, not being counterbalanced as in France by proper amortization of the shares, has rendered the future prospects of a number of English companies rather gloomy.

We are convinced, taking all into consideration, that the amount of American railway stock issued is considerably less than the actual cost of their lines, and still less than the expenditure which would now be necessary in order to construct them. But whether one tries to compare the net profit with the one or the other of these figures, it is impossible for us to conceive what light its exact determination, if it could be made, would cast on the discussion opened about the lowering, the maintenance or the raising of the existing rates. The idea that the fair tariff on each railway is that corresponding to the average rate of similar investments is simply absurd, for its direct consequence is that a badly arranged and badly managed enterprise can legitimately make its customers pay rates which would be improper on a well arranged and well managed railway. It is true that this is an opinion which is rather readily accepted by the public and by parliaments. Every request for help or for protection made by an enterprise which is going to ruin receives a favorable reception from public opinion, which, on the other hand, always considers as excessive the dividends of any enterprise which is very well managed, like our great railway companies, or like a mining company whose capital is very small because instead of issuing shares to cover all its capital outlay, it has during long years spent on this first of all the whole and later on a considerable part of the profits which the shareholders could otherwise have divided.

In fact, no matter in what way the capital outlay may be computed, the idea of allowing it an adequate return can never be used as basis in determining a fair tariff, for it would lead to the making of rates based neither on the nature nor on the needs of the traffic, and this would be the higher the poorer the districts the railways cater for and the worse the railways are managed. No doubt in enterprises in which competition is the rule, the cost price necessarily determines the selling price. But in those in which there is a monopoly and where the permanent charges due to the locked-up capital are enormous, it is impossible to find any other basis for their valuation than the following three fundamental principles: First, no rate must be less than the special supplementary expenses caused by the transport in question, leaving out of consideration charges of the enterprise; second, in order to cover those charges, rates must be made exceeding the minimum so determined, to the extent to which that is possible without becoming prohibitive to an important fraction of the traffic; third, the only way of not arriving

too frequently at such a prohibitive figure is to differentiate the rates according to what each class of traffic can pay, so far as that is possible without going in for purely arbitrary distinctions. These rules do not supply a standard which can be formulated in a set of regulations, and it is this which justifies the public authorities in intervening to give special decisions, either by confirming tariffs beforehand, as in France, or by correcting any abuses, as in the United States. These are, however, the only principles which can guide an administration which is conscientious and understands the real needs of commerce, so as to make its control effective without being injurious and arbitrary.

With the rates made in this way, if the net receipts are less than the expenses, it is for the companies which have established unremunerative enterprises or which are managed too expensively, to bear the consequences. If on the contrary, the working results in a big profit to capital, it is just that those should profit by it who took the risks, who knew how to discover important currents of traffic, and then well manage railway systems constructed under conditions so as to satisfy real needs. There is, however, no doubt that certain lines which cannot properly remunerate their capital can obtain for the public benefits much superior to the deficit probable. On the other hand, the profits of good lines can be very disproportionate to the risks run, and it is equally unsatisfactory to leave the entire benefit to the owner of a monopoly granted by the State, or to divide it between several companies, by uselessly increasing the capital expended by creating would-be competitors who very soon come to an agreement. This leads one to the idea of a financial association between the public authorities and the companies, making it possible to subsidize in part out of taxation the deficits of certain lines which are really useful, and to make the budget benefit by part of the profits of others. In this way it is possible to retain the advantage of economy which results from the operation of railways by companies interested in the profits and to avoid the political dangers of great State enterprises, without, however, making impossible the construction of mediocre lines and without leaving the owners of the good lines excessive profits.

The examination of the fundamental conditions of the railway industry thus theoretically justifies the combinations existing in France. In some cases, no doubt, these were based on reasons of expediency, but in many cases they were also due to the wisdom

of the founders of the French railways. It is true that the right of interfering with the affairs of the companies which this regime gives to the public authorities, makes it necessary that the latter should give some guarantees of wisdom and of moderation. In spite of the existing pressure of unenlightened opinion, the general management of the control of the State in France, and also that of the Interstate Commerce Commission in America, show that those conditions can be realized, provided that one can ensure sufficient independence and a good selection of the body of officials acting in the name of the State and of the judges charged with safeguarding the rights of everybody. Like all human affairs, the equilibrium so established is unstable and always threatened. In all countries the democracy, as formerly the absolute monarchy, as its power grows older and more established, becomes less tolerant of opposition and of independence. Just as modern public authorities readily obey numerous and irresponsible groups of electors, so they willingly hamper the working of private enterprises which prosper under able and energetic management, because they promote progress. In the case of railways, which affect so many interests in so many different ways, it is very difficult to fix the correct amount of intervention. It is certainly interesting to see the United States draw nearer, now that their economic position becomes comparable with that of Europe, to the system of control so often criticized in France, and to observe at the same time the deadlock which results from the absence of any financial association between the State and the companies, when they wish equitably to limit the profits of the latter. But it must not be forgotten, in a country where the needs were great, where no means of transport existed and where their development involved an immense amount of foreign capital, that development was carried out with unexampled rapidity under the regime of freedom of the railways. Perhaps it would have been difficult for the latter to render the same services under a control which would have been unable to stop any abuses without often hampering the initiative necessary.

EXPERIENCE OF A RAILROAD COMMISSIONER

Remarks by
HON. JOHN B. OLMSTED.

In Connection With His Retirement as Public Service Commissioner
of New York State, Second District.

I came into office with decided leanings towards the anti-corporation view of public utility questions. Some of my good friends among the corporation lawyers in Buffalo were kind enough to say that I was too much of an anarchist to be of much use as a commissioner. Want of knowledge as to the precise point involved I have found in many cases to be the principal cause of the prejudices I then entertained. Experience has taught me that there is another side to these questions, and one not lightly to be dismissed.

For instance, I held the view, as I imagine many another person holds the view, that the New York Central Railroad is grossly over-capitalized, and is paying dividends on a large amount of what is popularly known as water. When it came to my knowledge as a part of the evidence of a long investigation in the Buffalo, Rochester & Eastern case that the estimated cost of that company's 300 miles of railroad from Troy to Buffalo, planned without adequate allowances for terminal yards and facilities at either end, and touching but one or two large centers of population, was approximately one hundred millions of dollars, I came to the view that the New York Central, with its four tracks running through the heart of so many great cities of the state, with all the attendant advantages to freight and passenger business, and with approximately 500 miles more trackage, including the vast and valuable terminal facilities of New York City, might possibly on a valuation measure up to a capitalization of five times that of the B., R. & E.

MANAGERS CONCILIATORY.

I have changed my mind also as to the attitude of most corporation managers towards the public. I had expected to find it recalcitrant and objurgatory, which is a Latinized and "more tenderer" way of saying that it was made up of kicks and damns. I have found it almost uniformly, when expressed in the presence of the commission, conciliating and willing to abide by the results of a fair hearing. The difficulty with me has been not so much

in getting the corporations to do what I thought was right as to determine in my own mind what under all the circumstances of certain cases was right.

I am fully aware that this is not the popular view of public service corporations, nor do I wish to be understood as having discovered wings on the shoulders of the managers thereof. I say that a better knowledge of the conditions under which their business is carried on brings one to a more just appreciation of some of the difficulties under which they labor. I know well that there are many—very many—particulars in which the service which they are rendering may be improved, as I know well that there are very many particulars in which the business of every man in this room might be improved if an inquiry into it were started by a commission armed with power. Such a commission would be at once met with the objection that its suggestions required too much of an outlay to carry them out, and would be asked how it proposed to provide the funds for the improvements recommended. Let us be reasonable as well as critical. Let us realize that the management of one thousand men on a street car line is no less difficult than the management of an equal number in a factory, and that there are times when you have to do the best you can with the material with which you have to work.

"STRAIGHT" STREET MORE POPULAR.

I believe that in the past ten years a great change has come over the minds of men who are in the management of public utilities. There are still some left who cling to the old "public-be-damned" idea, but they are fast being supplanted, and the up-to-date railway or electric light official stands ready to listen to any reasonable complaint that may be brought to his attention, and what is more to the point, to turn a deaf ear to proposals which call for abhorrent and forbidden methods in their accomplishment. I am not innocent enough to believe that all the dark, devious and easy ways of "getting there" have been wholly abandoned; but I do hold the view that the street called "Straight" is a much more popular thoroughfare than it used to be, and that the directors and agents of the corporations over which we have control are walking it with much cleaner consciences and with great gain to their self-respect.

RISKS OF INVESTMENT.

I have intimated that one great difficulty with certain corporations is the lack of means to carry out the improvements to service which

their operating men admit would be advisable and desirable. On this point some figures from our last annual report may be illuminating. Out of 78 steam railroads reporting to the commission in this state, only 27 paid any dividends for the current year. Out of 364 electric railroads, light, heat and power, and gas corporations, 237 paid no dividends. In 1909 it was 237 out of 310, so that conditions are improving some; but the figures are significant. They are contradictory to the general impression that dividends are the foundation upon which all public service corporations are erected, and they have a sobering effect upon an official who starts in with the idea of building Rome—or even Schenectady—in a day.

The consideration of them has not swayed the mind of the commission where conditions have become intolerable or even irritating; but they have at times prevented the attainment of ends which otherwise might have been ordered.

I know that these views are not wholly popular, and I know that in certain quarters the idea prevails that a public service commissioner should be pictured with a knot of thongs to lash the sides of all the hated corporations, irrespective of their merits or deserts. In my view that savors too much of "Donnybrook Fair." I like the expression of President Taft, who quietly reminded his hearers on one occasion, as I recollect it, that the phrase "all the people" means just what it says, and that "all the people" included also the corporations, which are made up of people just as much as a municipality is.

EVEN-HANDED JUSTICE.

The Public Service Commission is organized to hand out justice as near as it can determine it, both to shippers and to carriers, to consumers and to producers, and if it has attained some success in its work of the last five years, it has done so by a strict adherence to that view, and not by spectacular brandishings of the "big stick." It has accomplished more good by getting both parties before it, pointing out the strength or weakness of opposing views, and then appealing to that sense of fair play which is inherent in every man, than it ever has by a display of the tremendous powers which the law undoubtedly confers upon it.

ADEQUATE SERVICE AND FACILITIES OBLIGATORY.

BY HON. CHARLES A. PROUTY,
Chairman I. C. C.¹

It frequently happens in the social and political development of a country that a tribunal which is created for one purpose comes to exercise powers and discharge duties of a somewhat different character. So in the case of the Interstate Commerce Commission, it is not at all certain that the final end may not be largely different from that which the original promoters of the Interstate Commerce Act had in mind, but in order that you may understand the development of this law I must take you back a quarter of a century to the date of its enactment.

You, all of you, know as practical men, that the freight rate is at the foundation of every business. All of you know as practical men that whether or not a business can be conducted very often depends upon the rate which can be obtained. I am not familiar with the details of your business, but I undertake to say that if any one dealer here in Kansas City enjoyed an advantage in the freight rate of 50 cents a ton, that would give him practically a monopoly of the business.

Now, 25 years ago there was no such thing as a published railway tariff. The railroads of this country printed and circulated schedules, which purported to show the rates of transportation, but the rates named in those schedules were hardly ever observed. Every man did business upon a special rate, and whether or not he obtained the rate determined whether he could transact the business. It came to pass that the traffic manager of a railroad company determined where business should be done, and by whom it should be done. One of you gentlemen might have the money, you might have the disposition, you might have the ability, to engage in the hay business at Kansas City; but unless you could obtain the rate, you couldn't do it.

Now, the first purpose of the act to regulate commerce was to give to every shipper the same rate, under the same circumstances.

¹ Address before the National Hay Association convention in Kansas City, Mo., July 16, 1912.

The fundamental principle of that act, and the fundamental principle of the activities of the Commission to which I belong, is absolute and complete equality.

You understand now that every railroad must publish its schedules. You understand now that every railroad must observe those schedules. You understand that it must collect that rate in cash.

You ask me what the act to regulate commerce has done for the National Hay Association. In my judgment, there would be no National Hay Association, certainly not a National Hay Association with almost a thousand members, were it not for the act to regulate commerce; for the business of handling hay in this country would have drifted into the hands of a comparatively few great dealers. The reason that all you gentlemen are engaged in this business is because every man has an equal opportunity before the law to engage in it. (Applause.)

The second purpose of the act to regulate commerce was somewhat different, and I am not going to take up much time with that. The railroads of this country are private property, but the function which those railroads discharge is a public function. A railroad is a monopoly. You must have the service, and you must pay the rate the railroad asks of you. Now if the man who owns that railroad can impose on the man who must have the service of the railroad whatever rate he sees fit, it follows that one kind of property can lay upon all other kinds of property a tax for its benefit.

It had come to the idea in 1887, when the act to regulate commerce was enacted, that railroad rates in this country were exorbitant. Great fortunes had been accumulated in the railroad business, and while those fortunes had not usually come from the imposition of unreasonable rates, but rather from the manipulation of railroad properties and railroad securities, still the public did not distinguish, and in the public mind the rate was exorbitant because the fortune was exorbitant. These railroad magnates were using the power which they thereby acquired to perpetuate their own fortunes. Legislatures were bought up; judges were appointed; even the highest executives in the land had to bow down to these gentlemen in order to secure an election. Now, out of all this grew a demand for some effective way in which to make railroad rates reasonable, and the second purpose of the act to regulate commerce was to compel the charging of a reasonable rate. The act

provides that all rates shall be reasonable, and the commission is given authority to order a carrier to cease and desist from charging an unreasonable rate, and it has the authority to prescribe what a reasonable rate is. The two original purposes, therefore, of this act were, first, to prevent discrimination; second, to make rates reasonable.

Now, gentlemen, I think those two purposes of the act to regulate commerce have been in the main accomplished. I do not mean to say that there is today no discrimination. There is a continual tendency upon the part of the railroads to violate the criminal provisions of the act. The enforcement of those provisions can only be had at the price of eternal watchfulness.

We have before us continually very important and very delicate questions involving discrimination between commodities and discriminations in other ways, but those questions can be dealt with. I think that the general level of railroad rates is low enough, although many rates are still too high, and some rates are undoubtedly too low.

A gentleman wrote me the other day, a representative of a great financial house, saying if you gentlemen of the Interstate Commerce Commission were to give the railroads carte blanche to advance their rates, and if the public were to withdraw all protests against the advance of freight rates, nevertheless it could not be done; his idea being that if the railroads were to advance the rates they would stop the traffic, and thereby defeat the very purpose which they had in view.

Now, that is true with respect to some localities. It is true with respect to some few commodities. But with respect to the great mass of commodities, and the great mass of localities, it is not true. Take, for example, the commodity in which you deal—hay. I asked my statistical friend on the commission to tell me how many tons of hay, including alfalfa, became the subject of transportation by rail during a year, and his answer was, seventeen million tons. The great bulk of all the hay that is cut in this country is fed out where it is cut, but about 17,000,000 tons of hay and alfalfa are transported by rail. Now, suppose the rate under which that hay was transported should advance one single cent per 100 pounds. That would mean 20 cents a ton, and that would again mean a net additional return to the railroads of \$3,400,000.00. All of you

know that that advance would produce no effect whatever upon the movement of hay.

What is true of hay is true of almost everything else. So I say to you that it is necessary that there should be a continual watchfulness over the rates of this country, if they are not to become too high. But nevertheless, I do think, gentlemen, that what I may term the danger point in the railroad situation has very radically changed in the last 25 years. Twenty-five years ago the danger point was the discrimination. Twenty-five years ago the danger point was the unreasonable rate. Today, in my opinion, neither of those are danger points. The danger point today, I think, is the inadequate service and the inadequate facility. (Applause.)

Now, I am speaking to business men. I believe you will agree with me that the service and the facility are of more importance to you than any slight difference in rate. You want your cars; you want reasonable expedition; you want everything which goes with an efficient service and that you must have.

Five years ago I came to Kansas City. I came here for the purpose of investigating what we then termed the car shortage. I am sure I have some shippers before me here who can remember the conditions then. Crops were rotting upon the ground because they could not be taken to market. A little later in the season, men and women up in the northwest were hungry and cold because the railroads of that section could not transport coal with which to cook their food and warm their houses. The panic which stopped everything relieved that situation, but the situation was a serious one. Now it is the apprehension, the possibility that that situation may return, which I look upon with the gravest doubt.

There is continually present in the mind of every man the bugaboo of government ownership. Now, my friends, if we ever have government ownership in this country, it will not be because rates are unreasonable, for we can make them reasonable. It will not be because there are discriminations, for we can correct those discriminations. It will be because in no other way than by government ownership can you and the other shippers of the country obtain the facilities of transportation which you must have. A continuation for one twelve-month of the conditions of 1907—the fall of 1907—would result in something approximating government ownership. So I say, gentlemen, that today the thing which the Interstate Commerce Commission in all its activities must keep in

mind is, not only discrimination, not only the unreasonable rates, but especially the service which you gentlemen must have.

You ask me what the connection is between Mr. Goodrich's letter and the service which the railroads of this country should render. It is here: There has come to be an impression that the business of the Interstate Commerce Commission is to stand for the shipper and against the railroad, and that it only does this when it reduces rates.

The original purpose of the Interstate Commerce Act was to protect the shipper. The most eminent man who ever sat on the Interstate Commerce Commission was its first chairman, Judge Cooley, and very early in the history of that commission Judge Cooley published an opinion in which he said that the business of the commission was not to enable railroads to maintain reasonable rates, but to protect shippers against the imposition of unreasonable rates. Now, gentlemen, I think since Judge Cooley published that opinion conditions have changed. I think that today it is just as much the duty of the commission to see that the railroads are given reasonable rates which will yield to them a fair return, as it is to see that no unreasonable rate is charged the shipper, and I believe this is in the highest interest of the shipper himself. It is that thought which I have come here today to try to express to you. Let me see if I cannot make plain what it is I mean; what this thought is that I would like you to remember.

At the basis, my friends, of all right thinking about this subject lies the fact, very often stated, very little apprehended, that the railroad is a public servant. The property is private property, but the thing done is a governmental function. It is done by the government in most European countries. Now, if the government is the master, and if the railroad is the servant, the servant cannot properly discharge its duty unless the master, instead of hampering and discouraging, sees fit to assist and foster.

You gentlemen understand that if the business of this country is to develop the railroads must develop also. You gentlemen also understand that in the case of many railroad systems, and perhaps most railroad systems, their business is developed up to the point where but little additional business could be taken on, with the present facilities. If you are to have the service which you must have during the next ten years, it will be necessary for the railroads

of this country to provide additional tracks, to provide additional terminal facilities, and to buy more equipment of all kinds.

WHERE RAILWAY CAPITAL COMES FROM.

Now where is the money to come from with which that is to be done? Where did the money come from that built the railroads of this country? It came, my friends, from the private investor; it came from exactly the same source that the money comes which operates your business, which operates every other business. And why was that money put into railroads? It was put into railroads because the people who put it into those railroads believed that it would pay a return. This money which must be had by the railroads of this country has got to come from this one source—private investors. In the past railroads have been able to borrow whatever their necessities required. Railroad stocks have been a favorite form of investment. Railroad bonds, next to municipal bonds, have sold higher than any other securities. Now, if that is to continue, gentlemen, it must be because the railroads make such earnings as will justify the investment.

What is a railroad for? What is the only purpose for which a railroad is constructed and operated? To transport merchandise and passengers. What is the only source of income which a railroad has? The only source of income it has is the money which it derives from the service of transportation. Consider for a moment a great railroad system like the Pennsylvania, the greatest railroad system in the whole world. Why, gentlemen, hundreds of millions of dollars have gone into the construction of that railroad. In the past, few institutions in the world have enjoyed better credit than the Pennsylvania railroad. Its very name is synonymous with financial strength.

Let the government reduce the charges of that railroad so that it can simply pay from those charges the expense of its operations, and what have you? That magnificent property is absolutely worthless. Its credit is destroyed. It can sell no share of stock and can sell no mortgage bond. When you reduce the rates of the railroads of this country to a point where they no longer yield a profit, you have destroyed the value of their property, you have annihilated their credit, and you have made it absolutely impossible for the railroad to provide the service which you must have.

I ought, as a member of the Interstate Commerce Commission, in passing upon the reasonableness of a rate, to bear in mind the

fact that that property has been dedicated to the public use upon the theory that it is to enjoy a fair return. But if I were to lay out of view entirely the interest of the railroad, if I were to consider your interest, and your interest alone, it would still be my duty, and my highest duty to you, to allow the railroad a sufficient rate so that it might from that rate obtain the needed revenue with which to develop, with which to maintain its credit, with which to give you the service which you must have, and which you cannot otherwise enjoy.

I said to you that the important thing was the service, I have just been holding an investigation up in New England into the railroad conditions, and the cry there is not for a lower rate, but for better service. My observation there and my observation in every place, has convinced me that at the present time the railroad service of this country in certain places and in certain parts is pretty good, and in other places and in other parts is mighty poor. If you take the service between two great commercial centers, like Chicago and New York, it is almost unexceptional. I doubt if there is any place in the world where the freight service is better. It turned out in my investigation up in New England that if you shipped anything from Boston, it went to its destination by almost express service. It is 250 miles from where I live to Boston, and a merchant in my little town receives goods from Boston in 24 hours. But Lowell and Nashua are 14 miles apart. Now it appeared in that investigation that it took a week, oftener than otherwise, and never less than two or three days, to send anything by freight that 14 miles from Lowell to Nashua. When you get off the main line of thoroughfare, when you get to a point on a railroad that is local to that railroad, where there is no competition, you find an extremely poor service.

Now, I think, gentlemen, that that should be corrected. You are interested in having that corrected. What you want at all points is a reliable, a safe and a dependable service. I hope that this very investigation may result in the formulation of some rules and the adoption of some methods by which this local service will be very much improved. If it is not improved, then I think that the Interstate Commerce Commission or somebody else should be given jurisdiction to improve it.

At the present time we have no authority over the service of railroads, but only over their rates. And what I want to call your

attention to in particular is the possible recurrence of conditions like those which existed in 1907. As I have said to you, I came down here and spent three or four days in examining shippers and railroad witnesses as to those conditions. I can best tell you what the remedy ought to be by pointing out to you what the difficulty was.

The railroads of this country, while they are owned and operated by different companies, are really all part of one great system. Under ordinary circumstances, the cars of one railroad move freely onto the line of another railroad. I used to be attorney, years ago, for a railroad up in Vermont known as the Rutland railroad. It owned, I believe, in all something like a thousand cars. Not very long ago I went across the continent, and away out beyond the Rockies I looked onto a side-track and saw standing there a car marked with that familiar name, "Rutland Railroad." It shows you how completely the cars of one section go into other sections, with some few very marked exceptions.

Now, when the pinch came in 1907, every railroad undertook to protect itself. The M., K & T., for example, would originate a car load of hay which was destined to some point on the Chicago & Northwestern. It would bring that car load of hay up to Kansas City, but it said, "My car shall not go beyond my own line." It became necessary, you see, to unload that car at Kansas City, and it became necessary to secure some car to put that load into. The Northwestern didn't reach Kansas City. No line which did reach Kansas City would suffer its car to be used for that purpose, and you had to wait a week or ten days, or two weeks, until by some hook or crook you got hold of a Northwestern car down here. You can see what the result must have been. That very thing today would paralyze the railroad transportation of this country.

I don't say that the traffic could have been handled in 1907 with the equipment and facilities which then existed, but I do say that if the Interstate Commerce Commission, or any other body of sensible men, had had the authority to do it, they could have very much ameliorated and almost done away with the serious condition which existed. Today the commission has no authority except over rates. It has no power to make a train schedule. It has no power to do anything except to fix the rate; no power over the operation of the road. Now, if you are to deal with situations like those of that period, somebody must have the power to say, and say

right off without any foolishness about it, to the railroads of this country: "Your cars shall go here and there." It must have power to say to the railroad that receives the car, "You shall transport it to destination, and you shall send it back." It must have absolute power to dictate the movement of this equipment, and with that power it can go far toward breaking up these embargoes, these congestions, these interruptions of traffic which so frequently occur. (Applause.)

Now, there is one other thing. We found at that time that there was a shortage of railroad facilities. Beginning with 1896, the railroad business of this country had steadily developed at the rate of 12 per cent to 17 or 18 per cent increase every year. Managers of our railroads had said: "This thing can't continue." They had not provided facilities upon the theory that it was to continue, and the result was that in this year there came the greatest increase of all, when no increase had been expected, and everybody was found short-handed. There were not tracks enough, not cars enough and especially there were not terminal facilities to handle the business.²

For the last five years the facilities have been reasonably adequate. For the last five years, I think that most railroads have operated upon the theory that they must provide facilities which are in excess of the business which they are obliged to handle, but a great many of our poorer railroads do not. When the stress comes there is no distinction between the good road and the bad road. The provident road has to answer for the sins of its improvident connection. Now, gentlemen, if that situation is to be dealt with, some tribunal has got to have power to say to every railroad which engages in interstate commerce: "You shall provide your share of the terminal facilities; your share of the tracks; your share of the motive power, and your share of the cars." And unless it does possess that power, you cannot deal with the situation when it arises.

Now, you may say that would be a very foolish thing to do, to allow the Interstate Commerce Commission to order a railroad to put its track in order, increase its terminal facilities, increase its

² In 1907 the Interstate Commerce Commission reported an increase of 11.8% in the tractive power of locomotives and of 13.5% in the capacity of freight cars. In the calendar year 1907, 5,457 new locomotives and 284,188 new freight cars were built in the United States, exceeding all records.—S. T.

equipment, unless it stood ready to furnish the money with which to do it. Of course, no order of that kind ought to be made, and of course no order of that kind would be made ordinarily. But, gentlemen, could anything be more helpful to the situation than to require the Interstate Commerce Commission, through its experts, to inform itself of the physical capacity of every railroad in this country, to enable it to determine whether that railroad ought or ought not to make additions to its facilities, and to inquire whether it could or could not provide the necessary funds for that purpose? It seems to me that that thing would bring the commission into touch with the railroad situation in a way in which it must come in contact with it, and in the way which would be of the greatest benefit.

Now, gentlemen, in conclusion, I want to recur once more to this thought to which, as I have said to you, I attach most importance. It is not a popular thought, but it is a thought which you ought to have in mind and which you ought to consider.

If the Interstate Commerce Commission has been of any service to this country, it is because in the past it has enjoyed the support and the confidence of the shippers of the country. If that commission is to be of any benefit in the future, it must enjoy in the same measure, that confidence. In the past, as a rule, the orders of the commission have been in reduction of rates rather than in permitting their advance. There have been some conspicuous exceptions to that rule, and the National Hay Association is one of them. In your suit, we decided that the advance might be made. I dissented from that opinion, but I cheerfully admit that my associates were right. Still, as a rule, our orders have been in the reduction of rates. Now, I am not saying to you gentlemen today that I think there is any immediate danger of an advance in rates. It is only a year and a half since the Interstate Commerce Commission, after a most elaborate investigation, reached the conclusion that there ought not to be any general increase in rates. But this is a time of change, and no man can forecast the future. The cost of living is advancing. The cost of almost everything which a railroad buys is increasing. Wages which they must pay are increasing. There is now in process of arbitration in the city of New York, before a very eminent board of arbitration, a question touching an advance in the wages of engineers in official classification territory. I noticed that Mr. Worthington said yesterday that if the claims of those engineers

were allowed, and if the claims of the firemen and the other employes which had already been made in the same line were allowed, it meant an addition to the expenses of the railroad in that territory of \$63,000,000 a year. It is possible, gentlemen, that the value of a dollar, that thing by which you estimate the price of everything, has decreased, so that a rate of 100 cents per 100 pounds today may in fact be less than 100 cents per 100 pounds was ten years ago, although the statement of it is the same. So I say to you, gentlemen, that no man can foretell whether in the years to come it will be or it will not be necessary to allow some increase in the transportation charges of our railroads. What I desire you to remember is this: That if that time comes, it will be the duty of the commission to permit that advance. That would not only be an act of justice, which you, as believers in the square deal would approve, but would also conserve in the highest degree your interest as shippers. Gentlemen, I thank you. (Applause.)

THE COUNTRY'S NEED OF GREATER RAILWAY FACILITIES AND TERMINALS.

BY MR. JAMES J. HILL.

ADDRESS DELIVERED AT THE ANNUAL DINNER OF THE RAILWAY BUSINESS ASSOCIATION, NEW YORK CITY, DECEMBER 19, 1912.

The subject of national transportation is many-sided. One aspect of it takes precedence in one community or in the opinion of one interest, while for others some different phase ranks all the rest. But every interest and every community should understand that the main need today of transportation and of the many activities connected with and dependent upon it is an increase of terminal facilities. It is no exaggeration to say that the commerce of the country, its manufacturing and agricultural industry, its prosperity as a whole and the welfare of every man in it who engages in any gainful occupation can escape threatened disaster only by such additions to and enlargements of existing terminals at our great central markets and our principal points of export as will relieve the congestion which now paralyzes traffic when any unusual demand is made upon them. Our natural material growth will make this their chronic condition in the near future unless quick action is taken.

If you increase the size of a bottle without enlarging the neck, more time and work are required to fill and empty it. That is what has happened to the transportation business. In 1907 traffic was blocked on nearly all the principal eastern railway lines. It took months to convey an ordinary shipment of goods from one domestic market to another. The deadlock was broken partly by a panic that lessened the volume of business and partly by the efforts of railway managements to add, by increased efficiency, to the moving power of facilities at command. We neither anticipate nor desire perpetual business depression. While the limits of efficiency have not been reached, we know that it cannot be made to cover the demands of our growth in population and production. The records of any large city will prove this. The tonnage of the Pittsburgh District, for example, by railroad alone, grew from 64,-125,000 to 152,000,000 in the ten years between 1901 and 1911. It is both practical and patriotic to ask what is to be done.

First, let us examine the following table compiled from the reports of the Interstate Commerce Commission, showing the recent growth of the transportation business of the United States:

	Increases, Per Cent		
	1895 to 1905	1905 to 1910	1909 to 1910
Mileage	21	11	1.5
Locomotives	35	22	3
Passenger Cars	23	16	3.3
Freight Service Cars.....	45	23	3
Passenger Mileage ¹	95	36	11
Freight Ton Mileage ¹	118	37	16.6

Business is beginning to feel the swell of a revival. The freight ton mileage of the country was less by seventeen and a half billions in 1909 than in 1907, and very little more than in 1906. Contrast this with the growth of the single year between 1909 and 1910. The freight ton mileage grew in that year eleven times as fast as trackage, and five times as fast as equipment. This ratio will be subject to increase rather than decrease. It will be much greater in this year of large crops and added tonnage. If any manufacturer were confronted with such conditions, it would be clear to him that he must either refuse business or more than double his plant. The railroad cannot refuse business. If it could do so legally, that policy would still mean national panic and individual ruin. It must enlarge its plant. Just what this means in the expenditure of billions of dollars on new track and rolling stock I demonstrated more than five years ago, and the facts have now been accepted by all authorities. But even the existing plant cannot be worked to its capacity without larger terminals. Hence the supreme importance at the very outset of this factor of the transportation problem.

This matter is vital not only to the railroads, but to every business man. It is the immediate concern of every large city. Cities can grow, they can escape decline, only as the movement of business between and through them is kept free. When the people find that their business cannot be handled, they must either move away or cease producing and consuming. They will decentralize their

¹ These increases would have been an incredible miracle except for the fact that the capacity of the equipment in the meantime had increased in the following ratios:

	Increases Per Cent	
	1895 to 1905	1905 to 1910
Locomotives, weight on drivers.....	84	37
Freight cars, capacity, tons.....	82	44

traffic, so far as that can be done; and the inability of the railroads to prevent this, by reason of conditions imposed on them from without, will work injury to all the great markets which have arisen through the free play of economic forces and the wise judgment of the builders of our prosperity. No city can afford to place its trade, which is its life, on a false basis. When the commerce naturally tributary to it is handicapped by poor terminals, or overloaded with too heavy charges on account of the excessive cost of enlargement, it will go elsewhere. There are a dozen places between the Maine coast and Norfolk that could be made available for relief. A city can never grow great enough to defy safely the demands of the laws of trade and its proper accommodation. Should the decentralization plan be forced on traffic, some of our greatest cities would not merely forfeit their natural share in national growth, but they would surely decline in business, wealth and power.

Interest in this question should be not local only, but national. A railroad terminal performs the same function as a harbor. It is actually the largest and most valuable harbor used by the nation's commerce. Probably no greater volume of rail and water traffic is transferred in any city anywhere than in Duluth-Superior. On the land side almost the whole of this is carried by three railroads. It is received, transferred and discharged without congestion in the busiest seasons and with expedition because the terminals there have been specially created for the work they have to do. The nation has properly made the provision of adequate harbors its care, and expended millions of dollars on our seaboard and the Great Lakes to ensure ample facilities for loading and unloading cargoes. It is not to be supposed or desired that the nation should furnish the money to provide those great harbors known as railroad terminals, although they are vastly more essential to the free movement of trade. But it should smooth the way and make easy the task of those whose business it is to provide them.

When traffic is blocked and the railroad yards of the principal cities are filled with cars that cannot be moved, the railroad suffers the loss of a portion of its earnings; but the business man loses a larger share of his trade, and the workingman his employment. No industry can do more than protract a starved existence when the currents of transportation cease moving freely. When the commerce of an industrial empire whose magnitude is partly indicated

by the clearing house exchanges of \$102,000,000,000 in New York City alone during the past year is blocked, the whole nation suffers.

Whenever we have a big crop or a general revival of business, the country hears most of the danger of a car shortage. The public assumes that if enough cars are provided they can be moved on schedule time from point of origin to destination, wherever these may be. This is not the real trouble. What is really needed is the greater movement of cars. The average movement of a freight car is about 24 miles, or two hours, per day. Delays in loading and unloading by shippers are partly responsible, but much of the lost time is consumed in getting into, out of or through terminal points where there is not room to handle the cars. More cars intensify instead of reducing the trouble. No other business could endure the loss of the use of its machine plant for twenty-two hours out of the twenty-four. One thousand cars will cover nearly eight miles of track. Each car must be switched, loaded or unloaded, or all three. This multiplies the trackage requirement.

A thousand cars are a fleabite compared with the daily movement in the busy season. The railroads of the United States carried 1,849,900,101 tons of revenue freight in 1910. At the average load of 21.5 tons per car, it would take 86,041,865 cars to move it. Nearly all of these pass through some large terminal, most of them several times in the year. There are about thirty important traffic centers; and if the total movement were divided equally between them, supposing each car to pass through but one market, and that only once a year, 7,858 cars would have to pass through each terminal every day in the year. Five thousand cars a day are enough to create a blockade in many of the large terminals of the country. Our worst troubles have come not from insufficient rolling stock or lack of efficiency in handling it, but from congested terminals. Water routes give little assistance: first, because the largest streams of traffic in the United States are not in a direction where either natural or artificial waterways can be used; second, because a waterway less than twenty feet deep cannot compete as a carrier. The waterway, too, may and often does increase rather than lessen the pressure on terminal facilities. There is but one possible remedy—enlarged terminals. The main question back of that is financial. Where and on what terms is the money to be had for an improvement become as necessary as the removal of a freight wreck from a main traffic line?

The two obstacles to be overcome in this readjustment of the transportation agency to the growing needs of the country are the physical difficulty and the cost. The railroads could not have foreseen and guarded against this need thirty or forty years ago. They could not then know where the greatest markets were to grow. They could not tell in what portion of any city it would be most convenient to have railroad yards placed a generation later. If they had secured land, changes in business districts would in many cases have made their forethought useless. Even if gifted with prophetic knowledge, they could not then have commanded the resources for such an undertaking, any more than the country town of today can put in all the improvements that its future as a city will require and justify. It is a natural and inevitable condition that we face. Upon the railroads rests the responsibility of performing the work now to be done. Will they be left free to attempt it under such conditions as will make the performance of it a feasible thing and not a miracle?

In some places it will be physically impossible to secure the land area for proper terminals. The space that must be used is generally in or near the business heart of the city; often along the waterways, where enterprise has been busy and land values have reached their highest point. Therefore the space for such terminals is either not available on any terms or will cost sums that sound fabulous. The financing of new terminals presents a far more serious problem than the financing of a new railroad. Large sums of money must be raised. The owners of capital will not supply them unless they are satisfied with the security and with the prospect for a sure and adequate return on their money.

What security can the railroads offer for such a loan? Already, merely for constructing and operating their existing machine, many of them have not only pledged their credit to the limit but have absorbed a large share of their surplus earnings that in other countries would have been paid out in dividends. The ability of the Pennsylvania system to handle its big business is due in no small degree to its past policy of diverting profits legally the property of the stockholders to the construction of betterments. There is not a well-managed railway of any size in the country of which the same is not true to some extent. And, with the increase of their expenses and the limitation of their income by public authority, there is coming to be little or no surplus revenue that may be so

employed. Net income, not gross, is the index of prosperity and the foundation of credit. Gross revenues grow, but expense grows faster. Returns to the Bureau of Railway Economics, covering 90 per cent of all the steam railway mileage in the United States, show that during the first seven months of 1912 operating revenues increased 3.3 per cent per mile as compared with the same period in 1911, operating expenses increased 4.9 per cent, and net operating revenue decreased .5 per cent. The additions to taxes and other incidental expenses will raise this figure. The progressive decline of net earnings per mile under the existing method of rate regulation is assured.

The properties of many systems are already encumbered to the limit of credit and solvency. Securities have been consolidated, equipment trusts have placed what are practically chattel mortgages on rolling stock, and money cannot be raised except for a short term and at high rates. Ten or fifteen years ago 4 per cent would bring in capital for railroad improvements. Strong properties sold their bonds bearing $3\frac{1}{2}$ per cent interest. Now some of the strongest roads are paying $4\frac{1}{2}$ per cent for new capital. Properties less well known for stability and earning power pay more. The rate has advanced by from $1\frac{1}{2}$ to 2 per cent in little more than ten years. The great sums required to extend our terminals to meet the actual business of the country can be had only on condition that the payment of principal and interest is absolutely secured. The railroads can pay money only as they are permitted to earn it. In the last resort it is up to the people to say whether or not these terminals and other facilities shall be supplied; just as it is up to them to suffer the severest of the consequences if they are not.

Two questions arise immediately and naturally from the situation as it discloses itself to any one who chooses to look at the facts. The first is, "Why are the railways not now in a position to borrow the money and build the terminals at once?"; the second is, "What have the railways done to entitle them to confidence, to relief and to a more fair and generous treatment by the public?" Each of them can be answered by an examination of facts officially vouched for.

The impairment of credit has already been partly set forth in presenting the difficulty of making loans for improvement purposes, and noting the higher rate that must be paid. How has this happened? The limitation has come, of course, from two directions;

decreased earning power and increased expenses. A railroad has no other source of income, generally speaking, than receipts from rates. These have steadily declined. While the price of everything else rises, the price of transportation falls. The average freight rate per ton per mile received by the railroads of the United States fell from 9.27 mills in 1890 to 7.53 mills in 1910. This is partly the effect of legislative regulations and the orders of public commissions, and partly due to voluntary reductions made possible by increased efficiency and increase in the density of traffic. On the whole, railroad rates in the United States are the lowest in the world. But they cannot continue to grow less forever.

Rates must be such as will bring in, above operating expenses, a reasonable return on the investment as measured by the value of the property. So much the courts will uphold. But that is not enough, if the railroads are to go into the money markets of the world as borrowers of billions of dollars. A man must do better than graze the sharp edge of bankruptcy if he is to find himself welcomed as a prospective creditor by the investor. So the railways, if they are to carry this new burden, must not only be protected against the further destruction of their credit involved in an unending succession of attacks upon their existing revenue. They must also be permitted to earn enough to assure capital that they can pay interest and principal of the heavy additional loans asked. By the light of this practical, unchangeable fact the railway regulation of the future must be guided. If it is not, then congestion and a general paralysis of trade, costing the country more than double its whole bill for transportation cannot be avoided.

The Railroad Securities Commission, with President Hadley at its head, the ablest and most disinterested body which has ever investigated the subject in this country, said in its report: "Where the future is uncertain the investor demands, and is justified in demanding, a chance of added profit to compensate for his risk. We cannot secure the immense amount of capital needed unless we make profits and risks commensurate. If rates are going to be reduced whenever dividends exceed current rates of interest, investors will seek other fields where the hazard is less or the opportunity greater. In no event can we expect railroads to be developed merely to pay their owners such a return as they could have obtained by the purchase of investment securities which do not involve the hazards of construction or the risks of operation."

Exactly what happens when this right rule is reversed, and the railroads are forbidden by curtailment of their earning power to attract capital may be understood from the following extract from an editorial on the financial year which appeared in the *New York Times* of October 3, of this year: "Railways have issued a total of stocks and bonds and notes smaller this year than last by \$23,821,100, while industrials have increased their issues by \$362,288,650. The decrease of the railway bond issues was no less than \$99,889,400, and they were formerly the favorite investment. The increase in industrials was mostly in stock, the figures being \$259,416,250. Formerly industrials were unable to market stock in competition with the railways, but this year they have been able to place between three and four times as much as the railways."

While revenue was shrinking, the obligatory expenses of the railways of the country have increased enormously. Their equipment alone is valued at nearly three and a half billion dollars; the increase during the last nine years being 45.3 per cent in locomotives and 39.7 per cent in freight cars. For the mere maintenance of equipment they spent over \$413,000,000 in 1910. When we come to consider operation, the figures mount as rapidly as those on a pressure gauge when the needle is racing toward the danger point. The wages of the railroad employes in this country have reached the stupendous total of over \$1,200,000,000 a year. According to the advance summary of the report of the Interstate Commerce Commission for 1911, the total number of employes in the United States decreased in that year by 29,611 as compared with 1910, while the total wages paid increased by \$64,741,164. In no other occupation has such a showing ever been made. If the wage scale of 1899 had been in effect, the item of labor cost would have been some \$300,000,000 less. Against liberal wages the railways do not protest, because they know that they can render safe, adequate and satisfactory service in proportion as their employes are well fitted and well paid for their work. But new outlay must be balanced by new income unless operation is to cease. Public sentiment almost always supports the demand of employes for higher wages. Public sentiment cannot, from the point of view of either justice or safety, continue to prohibit or prevent the levying of such rates as alone will enable the employer to pay the wage rate in many cases practically imposed from without as authoritatively as are the traffic rates that a commission orders into effect.

Another item of expense which grows out of all proportion to railway revenue or national development is taxation. In 1890 the taxes paid by all the railroads aggregated \$31,207,469; in 1910 they had risen to \$103,795,701; for 1911 they are estimated at \$109,000,000 and may be a couple of millions more. The increase in twenty years up to 1910 is 233 per cent. This is by direct act of the people. The extravagance of all modern legislative bodies, the doubling of state and national expenses within a few years and the continuous issue of bonds for all sorts of public purposes formerly met by general taxation have drained the ordinary sources of revenue. The railroad treasury has come to be looked upon as the public milch cow, from which a new supply of nourishment may always be obtained. So railway taxes have risen by leaps and bounds. Each mile of line in the country paid \$199 in taxes in 1890, and \$431 in 1910. The owner of capital will not be over-anxious to lend it to concerns which, if the present tendency is not checked or reversed, will presently see all receipts beyond a bare living income diverted by taxation to the public treasury. When the state appropriates out of the earnings of the railways, as it did in 1910, more than one-fourth as much as was paid in dividends to all the stockholders, the interest rate naturally rises and the possible supply of new capital for railway investment threatens to vanish altogether.

If you take two dollars out of your purse each time you put a dollar in, bankruptcy will happen in time. The railroads are not yet reduced to the point of collapse, because most of them are still permitted to earn and retain dividends. But their borrowing power has been cut down until it suffices only for hand-to-mouth improvement. Their credit must be so far restored as to make it equal to carrying forward the creative and constructive work which we have seen to be a condition of continued national growth. How does their record for trustworthiness stand? What have they done to show themselves fit for that larger liberty of action which is indispensable if they are to perform all the functions belonging to the proper conduct of their business?

The railroads of the United States are entitled to both confidence and relief because they have not abused their trust in the matter of capitalization. While, to make possible the raising of money, stock-bonuses undoubtedly were given in their earlier history, it is true of them as a whole today that they have by far the smallest

capitalization per mile in the world; and that they have kept their capitalization low by using for betterments millions of earnings which anywhere in Europe would have been handed over to stockholders, leaving the cost of improvements to be charged to capital account. This is one of the best-established facts in railroad history, though few people yet realize how great is the difference in our favor.

The statistics of railway capitalization, as given by the Interstate Commerce Commission, are, unfortunately, not always computed according to the same rules. This weakens or destroys their value for comparison. A change of statisticians may involve a change of method. However conscientious the motive, the result alters relations which should be constant. Thus the official railway capitalization in 1909 was \$59,259. In 1910 it is returned at \$62,657. But the increase is chargeable mostly to changes in the assignment of capital stock to one account instead of another; and one such change alone operates to increase the average capitalization \$700 per mile for the entire United States. "Manifestly," says the Statistician of the Commission in his report, "a figure so constructed should not be subjected to the burden of sustaining any very weighty conclusions." The Bureau of Railway News and Statistics estimates the capitalization of 1911 at \$59,345 per mile; probably \$60,000, in round numbers, represents about the average actual capitalization today. This figure is to be compared with the capitalization per mile in other countries, as shown in the following table:

United Kingdom	\$275,040
England alone	314,000
Germany	109,788
France	139,237

The increase of capitalization per mile of railroad in England and Wales for the nineteen years between 1890 and 1909 was from \$255,073 to \$328,761, or \$73,688; against a total capitalization for all the roads in the United States in 1909 of \$59,259. It exceeded our total capitalization by \$14,429 per mile. The average annual increase for the nineteen years has been \$3,873 per mile, exceeding the entire annual net earnings per mile of railways in this country during the corresponding period. Our capitalization per mile is from one-half to one-fifth that of European countries; partly because the initial cost of construction was greater there, but largely because of a fixed difference in policy. The American railway

makes improvements so far as possible out of earnings or surplus, leaving capital account to carry only new construction. The European road distributes earnings among its stockholders, and issues new capital to provide necessary betterments. The difference accounts for the sharp contrasts of the figures presented above.

The American policy is in the public interest, because it tends to keep fixed charges down. A management can take its own time about replacing a surplus used for improvements. When the money has been procured by issuing new bonds, the interest on these is a mandatory charge and must be added to the total to be raised annually from rates. So far as the public is concerned, the American policy is far better. And it should be remembered that it became the American policy by choice, not of legal compulsion, at a time when managements had a liberty of action denied to them now. It would be an ironic turn of affairs if this policy, deliberately followed of their own option by railroad managements through the whole history of American railroading, at the expense of the stockholders and because it favors the rate-paying public, should be reversed, and the burden transferred to the people's shoulders as a consequence of regulations prescribed by the people themselves. At present it seems not improbable that this will come true to some extent. A capitalization of \$60,000 per mile will not transact the business of the country. On all trunk lines and wherever population becomes dense and traffic heavy, capitalization will have to be made larger for new facilities and double tracking. The heavy amounts required to provide terminals must also be charged to capital account. With wages and material as high as they are now, billions will be required. If additional money must be borrowed for the less permanent improvement of which I shall speak presently, the country will eventually have to carry a capitalization more nearly approaching that of Europe; and, as a necessary corollary, rates will rise to a corresponding level.

The railways are entitled to confidence and relief because they have displayed efficiency in the conduct of their business. This is just as marked as their relatively low capitalization. The figures already given show an increase of traffic in a year about five times as great as the increase of equipment and eleven times the increase of mileage. Yet the machine has been hauling its load, because efficiency has been developed. Heavier rails, larger engines, cars of greater capacity, increased train movement and the full utiliza-

tion of equipment have kept business moving. The density of traffic in England, France and Germany should be as much greater than in the United States as the density in the Middle exceeds that in the far Western states. Yet here are the facts:

	Ton Miles per Mile of Road.
France	496,939
United Kingdom	529,622
Germany	827,400
United States (1910).....	1,071,086

It is clear that our railroads have been capably managed, and that the resources and powers entrusted to them are being used to the highest business advantage. How the money they spend is being employed is shown by the fact that our railroads move 272 ton miles of freight per dollar of net revenue, where the United Kingdom shows only 58, Germany 172 and France 88. For honest and efficient conduct our railways have no equals in the world. By this supreme test they declare their fitness for the gigantic work that still remains to be undertaken.

Not only, as I have shown, have they not charged to capital the cost of improvements covered by stock and bond issues in other countries, but they have shared their gains liberally with the people through rate reductions. It has become common to think of the progressive lowering of rates, while all other charges are rising, as the work of legislative compulsion. On the contrary, many of the most important reductions made in the past were voluntary. These are the lowering of charges on the great staple products of the soil. This has made settlement possible. It has made it possible for the farmer to realize the benefit of high prices for his crops. It has doubled production again and again. It has made possible the movement of lumber from the Pacific Coast to the Middle West and even the Eastern markets. It has become a definite policy. And it has left in the pockets of the people an enormous amount of money that would have gone to the carriers or at least been shared by them if they had fought against cheap transportation for the farm instead of fostering it. If the freight and passenger rates in force on the Great Northern system in 1881 had remained unchanged until 1910, there would have been collected from the public \$1,267,411,954 additional. This amounts to more than eight times the average par value of its outstanding stock and bonds in the hands of the public during the same period. That is to say, if there had been no rate reductions on that system during the past

thirty years, it could have paid off its entire capitalization every three and three-quarters years. If railroad rates in the United States had increased as much in proportion as the prices of commodities and the wages of labor between 1894 and 1909, the country's bill for transportation for those fifteen years would have been over seven billion dollars more than it was.

The railroads, then, have proved themselves competent and trustworthy. But if they are to furnish the necessary additions and provide new terminals, without which the traffic of the country can no more continue to move than a derelict can voyage from port to port, the money will not come, as a magician catches coins, out of the air. It must be either earned or borrowed. It seems clear to any one familiar with the conditions and requirements that both resources must be drawn upon. First capitalization must be materially enlarged. But the railroads must be able to show that they can earn a fair return before they can add to the principal of their debt. The very fact of additional capitalization involves additional fixed charges. The investor must be assured that such earnings will not be prohibited by the law before a loan can be placed at a bearable rate of interest. And the higher the rate, the greater must be the future charge on traffic to meet it. The country comes to a stop before a financial "no thoroughfare," from which no exit can be found save through a relaxation of the rigid and hostile prohibition of all rate advances that now absolutely negatives the proper and necessary expansion of traffic agencies in this country.

The theory of encouraging home industry has prevailed in this country during the greater part of our national existence. Import duties averaging 41.22 per cent were levied in 1911. The advocates of the system claim this is done to protect American labor. Our manufactures are protected as a matter of national policy. Transportation costs the public from one-third to one-half as much here as in Europe. This cheapness is not purchased at the cost of the workingman. In 1910 the average daily earnings of railway employes in the United States were more than twice as great as in the United Kingdom, and two and three-quarters times as much as on the Prussian-Hesse system in Germany. As employers of labor and also as producers of a commodity that everybody uses directly or indirectly, paying that labor more than it receives anywhere else in the world and supplying that service for less than is charged

anywhere else in the world, the railroads deserve a public consideration not extended to them now.

Second, the railroads should be permitted to earn and hold a surplus equal to 50 per cent of the amount they pay out in dividends, to be held for emergencies and applied to improved facilities. There are many expenses, and new ones constantly arising, that must not be added to capital charge unless rates are to be made that the public cannot and ought not to be asked to bear. In addition to the heavy demands of the ordinary growth of traffic, there are many extraordinary expenses. Public authorities do not hesitate to order the railroads to provide additional equipment. This, being only partially under the owner's control, is soon scattered over the country. The weaker roads prefer paying a per diem charge to buying for themselves. This compels the stronger roads practically to provide new equipment for the whole country and pay the cost of it from their own resources. Grade crossings must be eliminated both in the cities and in the country. The ordering of these is held to be a legitimate part of the police power of the state, whose exercise is unlimited. To raise or lower tracks at a single city may cost millions of dollars.² This class of expenses grows very rapidly in the United States as population becomes denser. Shall we capitalize them also, as has been done abroad? Safety appliances must be adopted. Ingenuity is adding yearly to the number of these; and the public demands rightly that they be put into use as soon as their value is demonstrated. But all these things take money—and a lot of it.

Steel cars are a good illustration of this kind of expense. They are coming into general use, and it has been proposed to make their purchase and employment compulsory even before their benefits have been fully proved. To buy them is a big expense, but that is only the beginning. A train made up of them is 65 per cent heavier than one composed of old style cars. More trains must be run to render the same service. Tracks and bridges must be strengthened. So the cost of service is increasing all the time through improvements that the railroads are just as anxious as the public to adopt. Every one of these improvements costs money. Very few of them produce one dollar of additional revenue. Yet the railroads must pay their bills or go into the hands of a receiver.

² In Chicago alone it has cost over \$75,000,000.

Such an increase of rates as will cover these expenses; the accumulation of at least such a surplus as will furnish funds for these daily demands in the domestic economy of the railroads, must be authorized, unless traffic is to decrease, transportation facilities to grow worse instead of better, or capitalization to be increased until any rates that the people can pay will fail to cover the fixed charges of the common carriers.

An extraordinary doctrine is now being propounded in many quarters. It is held that the accumulation of a surplus is evidence that rates are too high and ought to be lowered; just as if the man who earns, saves and puts a dollar in bank to meet future contingencies thereby admitted himself guilty of either dishonesty or extortion. It is held that a railroad has no right to receive or enjoy income derived from any other source than the operation of its plant. It is asserted that a railroad has no right to the natural increment in the value of its property, though this is not denied to any other corporation or to any individual under like circumstances. It has been attempted to apply these principles to the regulation of railway property, stripping it of privileges enjoyed by citizens and other corporate entities under the constitution. But how about the other side of the shield? Does the state recognize and abide by this same doctrine when its own revenue is at stake?

All the earnings of the railroad, from whatever source derived; all the property to which it holds title, no matter how acquired or held, is taxed by the state as the property of the railroad; either indirectly by a tax on gross earnings or directly on assessed valuation. The state has taxed surplus and all improvements made from it just the same as those made from the proceeds of stock and bond sales. Can it do this—can it tax all earnings, improvements made from earnings and surplus without confessing that the holders are entitled to the property and the income from it as truly as the state is entitled to the tax? The rule of fairness and the equal hand of the law should make the obligations and the privileges of the railroad co-extensive. The taxes paid by the railways of the United States in 1910 were about 13 per cent of the total interest and dividends. They were over 25 per cent of dividends alone. That is, the state received from the property one-fourth as much as all the owners of it put together. In the face of facts like these, no just man and no court that regards either law or equity should question the right of the railways to enjoy the natural increase and to earn the normal

rate of profit on all the property they hold, no matter how invested or employed.

It is not a political but an economic question that the country has to consider and solve. The adjustment of tariff taxation, the regulation of railroads and all other similar matters over which the legislative power has control and which are essentially economic and non-political are held deliberately within the range of current controversy for the advantage of party politics. So long as they can be kept from a fair and permanent settlement on the basis of economic justice, they will furnish rallying cries for the unthinking of one political party or the other. The country cannot rise to the level of its duty or its opportunity until the scientific knowledge of the expert and the action of the just judge are applied to the settlement of such economic issues.

The American people must soon begin to realize how injuriously they are themselves affected by a game that has been played for so many years with their business prosperity and their future welfare. Meantime the practical questions that I have presented and that grow straight from the root of the present situation remain. The wisdom, the desire for justice, the intelligent self-interest of the whole country should be concentrated upon the answer, which is not really difficult to find. The people must first realize that regulation must not be strangulation. Every restriction compatible with the public interest may be applied without impairing the position of the railways, or their ability to continue serving the public; because their interests at bottom are one. It is high time that a rational perception of this identity should put an end to hostile discrimination against the railroad, and a policy be shaped which will permit the railways of the country to lay a broad foundation for transacting the future business of the country, by providing the machinery without which that business cannot be done.

Since the greatest need is larger and better terminals, the process of improvement will be costly. Since the sum to be raised must be reckoned in billions, the railroads, if they are to maintain their wage scales, and their standards of efficiency, must be permitted to charge such rates as will enable them to pay interest on the additions to capitalization representing the money invested in new terminals, and also accumulate a surplus sufficient to take care of the constantly arising demands for additions to the existing plant. Courts and commissions will see that excessive rates are not col-

lected. On the other hand the courts have affirmed the right of the companies to earn a reasonable return on the total value of their property. Between these well-marked lines the railway rate should move, according to the needs of traffic and the development of the business of the country. Rates either permanently unchanged at the present figure or lowered by compulsion mean, in view of the existing emergency, nothing but ruin. That ruin will not be so immediate or complete for the railroads themselves as it will be for the business interests to which they will no longer be able to give a prompt and adequate service. It will be far-reaching, because its effects will touch every man, however humble, who is engaged in productive industry. If it comes it will be the most disastrous catastrophe in all our business experience. The whole question may be summed up in the simple fact that the business of this country has grown beyond the possibility of being handled by a railroad system costing on an average \$60,000 a mile. The experience of the whole world is against such a proposition.

I do not underrate the importance of other interests or issues, I only give due place and emphasis to this question when I say that it dwarfs by comparison every other that bespeaks the attention of our people. What, in comparison are any of the innovations or interpretations of the national will which have recently formed the subject of a nation-wide and passionate discussion? Across every stream of commerce where it enters a distributing city an obstacle grows higher every day, restraining the impatient tide of the nation's exchanges. It is time for all of us to lay aside prepossessions, hostilities, differences in points of view, and work together for an object infinitely more essential than most of the great enterprises deemed so national in their scope and benefits that they command not only the sympathy but the financial backing of the government itself.

It is the duty of every business organization, of every business man, of capital interested in safe investment and labor interested in sure and remunerative employment, to help swing the country into line behind the only policy that can help and save them all. No pledge of national credit, no subsidy in cash, no immunity or privilege is asked; only freedom to raise on reasonable terms the capital without which the work cannot be done; implying necessarily freedom to earn on that capital the return without which it will not be forthcoming, and enough additional to make and

keep railway equipment and service equal to the progress of invention and improvement and to the just expectations of the people.

No national or municipal campaign, no moral crusade, no commercial or financial adventure or assurance can demand or ought to receive from you and others like you the attention, the study, the energetic support claimed by the imminent and urgent issue which I have tried to present in outline. In a day of big things it looms above them all. The railways, anxious to be active in the upbuilding of the country and the introduction of a coming era in transportation, stand at attention. Will the country give the word of permission and remove the heavy cloud of doubt and depression which has steadily arrested the growth of the nation's commercial facilities?

FACTS TOLD IN A WAYBILL.

From the *Engineering News*. November 14, 1912.

A group of men sat in the smoking room of a Pullman car discussing current political and economic issues. The lead in the conversation was taken by a campaign "spellbinder," and when the discussion turned to the high cost of living he played over the bunker as follows:

"It's the railways that are to blame for this high cost of living. Everything you eat and everything you wear and everything you buy the railways bring from somewhere, and charge you freight for carrying it. So for every dollar you pay out for your living, part of it has to go to the railways. They are great big wealthy corporations. They ought to carry you cheaper where you want to go, and charge you less for carrying your freight. They ought to pay their men more wages, and they ought to fix up their tracks and run their trains so that they wouldn't have so many accidents. The trouble is railways ain't half run. They say that if one of these scientific management sharks had the job of running the railways, he could save them about a million dollars a day."

Among the group who heard this indictment of the railways there was one man who had hitherto been a silent listener.

This man now took a slip of yellow paper from his pocket and after scanning it a moment, replied to the spellbinder:

"The trouble with you and me, my friend," said he, "is that we believe what we read or what we hear somebody say; and it never occurs to us to use the thinking machine under our hats and dig out the truth for ourselves from the facts that are lying right around us.

"Of course, it's true that almost everything that comes on your table, that your clothes and the materials for them, and all the materials that the farmer and the miner and the manufacturer use, are all carried on the railway. It costs money to carry them, so the railways have to charge you and me freight. But if you think the rates that the railways charge for freight are excessive, just take an ordinary waybill and study it with common intelligence and see what sort of a lesson it will teach you.

"Here, for instance, is a freight bill which I received just as I left home. Four bundles of steel rods, weighing all told 365 pounds, were shipped from a mill in Pittsburgh to my home in a New Jersey suburb of New York City. This bill shows that the railway carried these bundles of steel, weighing a little over a sixth of a ton, all the way from Pittsburgh to New York, about 450 miles, and then out to the suburb where I live, and that it charged me the sum of *sixty-nine cents*. Then when these rods arrived at the railway station they were put on a truck and carted three-quarters of a mile to my house, and this bill shows that I paid the truckman for this job the sum of *fifty cents*.

"Perhaps you will say that we ought to build good roads, so that it wouldn't cost so much to haul freight to and from the railway stations; and I'll not deny that; but it happens in this case that the road from the railway station to my house is well paved all the way. Further, while the railway company out of its *sixty-nine cents* paid the cost of keeping up its railroad, in the case of the hauling from the station to my house, I had to help as a taxpayer to keep up that road, for the truckman and everyone else to use. So the 50 cents I paid for cartage is only part of what it cost me to have that steel hauled from the railway to my house.

"Perhaps you'll say that the truckman ought to modernize his business; but it happens that he delivered that steel with an automobile truck. Perhaps you will say that he charged too much for what he did; but his charge is just typical of what you and I and ten million other people are paying every day with never a thought of protest. I'm traveling now a distance of a hundred miles, for which I pay the railway, including a seat in this car, about \$2.50; but I will pay in hack fares and baggage transfers for being carried with my trunk about a mile at each end of my railway journey about two dollars, or as much as the railway charges me for carrying me and my baggage the whole hundred miles.

"There is nothing exceptional or extraordinary about this waybill. You may pick up any old waybill, and if you study it intelligently and fairly, it will teach you the same lesson. It will tell you that in the average town and city in the United States, it costs as much to transport the food and merchandise and building materials and all the things that enter into the cost of living from the railway station in the town to the point where they are to be finally used as all that is paid to the railway for bringing the things from

where they are originally produced to the town itself. Whether it be a bushel of potatoes, a pound of sugar, a yard of cloth, or a barrel of lime, there will be as much expended in transportation back and forth between various dealers and its final delivery to the consumer inside the city limits as all that is paid to the railway for bringing it from farm, or mine, or factory all the way to the town.

"Instead of the railway being responsible for the high cost of living, it is the railway that has annihilated distance and has made it possible to carry food products thousands of miles and then sell them at a moderate price. Stop all railway traffic entering a city for a single week, and see what prices the necessities of life will reach.

"Now, there is another thing that I want to say about your idea that the railways aren't well managed. We hear loose talk about the railways losing a million dollars a day by bad management, and great numbers of people—more's the pity—believe it. You hear people talking about having the government operate the railways, as if that would make sure that they would be well managed.

"Let's ask this little slip of paper whether the railways are efficiently managed or not. Let's see what the railway did to earn that sixty-nine cents I paid it. In the first place, a railway company through one of its freight agents in Pittsburgh received these four bundles of steel and made out a complicated receipt, in which it agreed to carry them to their destination and to be responsible for their safety. Somebody in the railway service had to decide by what route the shipment should travel, and somebody had to pick out a car going in the right direction and to the right destination on that route and order a freight handler to put the shipment in that car.

"The car was finally loaded with perhaps half a hundred similar small shipments of merchandise, a shifting locomotive was attached to it and shunted it back and forth through a maze of yard tracks until it was finally placed in proper position in an outbound freight train on the Pittsburgh & Lake Erie Railway. Over this railway the shipment traveled 103 miles to Andover, Ohio. Here it was transferred to a branch of the Lake Shore & Michigan Southern Railway. It continued farther north on this branch until it reached the main line at Ashtabula and then it traveled 129 miles eastward to Buffalo. Here it again changed hands, being placed in the custody of the Delaware, Lackawanna & Western Railroad. This com-

pany hauled it 410 miles to its terminal at Hoboken, and then 14 miles further on a suburban branch to its final destination.

"Thus this shipment of four bundles of steel, each of them weighing about 90 pounds, was carried a total distance of 681 miles for the sum of 69 cents. The railroad paid for the manual labor of loading it into the car at Pittsburgh and taking it out of the car when it reached its destination. The chances are that in addition these bundles were handled by manual labor two to four times during the journey in transferring them from one car to another, all of which the railways paid for.

"Strict account was kept by the railways of this shipment, and the total amount received (69 cents) had to be equitably divided between the three railway companies which performed the service. In this charge of 69 cents is included not only all the expense of operating the railway, wages of freight handlers, station agents, locomotive engineers, train crews, yard employes, fuel for locomotives, and all the thousand and one items that go to make up the operating expenses of a modern railway, but in addition the profit necessary to pay the interest on the railway's bonds and the dividends to its stockholders, without which our railways would go into bankruptcy and their efficient service would be at an end.

"I know something of what 'scientific management' can accomplish in reducing the cost of production in factories; but I do not know of any greater miracle in modern industry than that which the modern railway system has wrought in rendering transportation service at low cost.

"You hear it said, very frequently, too, that the railways favor the large shippers and that it is not possible for the small man to do business any longer because his big competitor can ship his freight so much more cheaply. It is true, of course, that the railways make a lower rate on shipments in carloads than they do on shipments like the small lot of merchandise to which this waybill refers. They *have* to do this because it costs them very much more to handle small shipments. As a matter of fact, I suspect that if careful investigation were made, it would be found that the railways are carrying a great many of their less-than-carload shipments at less than what it actually costs them. Their profits are chiefly made on the shipments which are loaded into a car at their origin and carried through to their destination without breaking bulk."

"Don't you think the government ought to run the railways?" queried one of the group of listeners, as the speaker paused for a moment.

"The government ought to do what it is now doing," he replied, "see that the railway treats all its patrons alike and plays no favorites, and that it gives good service at reasonable rates. After the government has done this, it should keep its hands off and let the railways do the very best they can.

"I have no small prejudices against government ownership of railways. The German railways are run by the government and are run well; but the German government can do things which we make a sad muddle of in this country; witness the government of German cities compared with our own. And when you make careful comparison, I believe our American railway systems are managed as efficiently and economically as any railways in the world. Of course, they are not perfect; nothing anywhere is perfect. Least of all can it be claimed that work done under government methods with their necessary red tape is perfect. On the whole, I believe the men who are running our great American railway systems, from president down to track walker, are doing honest, efficient, economical work, and that the American public ought to appreciate this fact and give the railways a square deal."

THE MINNESOTA RATE CASES.

SUPREME COURT OF THE UNITED STATES UPHOLDS AUTHORITY OF STATES TO FIX RATES AND REVERSES ACTION OF THE LOWER COURT. NOS. 291, 292 AND 293—OCTOBER TERM, 1912.

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| 291. George T. Simpson et al., Appellants, vs. David C. Shepherd. | } Appeals from the Circuit Court of the United States for the District of Minnesota. |
| 292. George T. Simpson et al., Appellants, vs. Emma B. Kennedy et al. | |
| 293. George T. Simpson et al., Appellants, vs. William Shillaber. | |

Mr. Justice Hughes delivered the opinion of the court.

These suits were brought by stockholders of the Northern Pacific Railway Co., the Great Northern Railway Co. and the Minneapolis & St. Louis Railroad Co., respectively, to restrain the enforcement of two orders of the Railroad and Warehouse Commission of the state of Minnesota and two acts of the legislature of that state prescribing maximum charges for transportation of freight and passengers, and to prevent the adoption or maintenance of these rates by the railroad companies.

The orders and acts, which by their terms related solely to charges for intrastate transportation, were as follows:

(1) The Commission's order of September 6, 1906, effective November 15, 1906, fixing the maximum class rates for general merchandise.

(2) The act, approved April 4, 1907, to take effect May 1, 1907, prescribing two cents a mile as the maximum fare for passengers, except for those under twelve years of age, for whom the maximum rate was to be one cent a mile.

(3) The act, approved April 18, 1907, to take effect June 1, 1907, fixing maximum commodity rates for carload lots of specified weights.

(4) The Commission's order of May 3, 1907, effective June 3, 1907, establishing maximum "in-rates" for designated commodi-

ties in carload lots from St. Paul, Minneapolis, Minnesota Transfer and Duluth to certain distributing centers.

HISTORY OF THE CASE.

After a prolonged investigation the Commission found the existing class rates in Minnesota to be unreasonable, and by the order of September 6, 1906, established a new schedule of lower maximum rates. The plan of this schedule was this: For first-class merchandise an allowance of 11.02 cents per cwt. was made for terminal charges, and in addition there was permitted a hauling charge of .98 of a cent for each five miles up to 200 miles, for each ten miles over 200 miles up to 400 miles, and for each twenty miles over 400 miles up to 500 miles. For other classes, the rates were fixed per centum of the corresponding rates for the first class. These rates were maximum terminal rates; that is, they related to transportation to or from certain important stations called terminal or distributing stations. Between stations, neither of which is so designated, the rates of the schedule might be increased by 5 per centum.

The railway companies complied with this order, and the class rates were put into effect on November 15, 1906.

COMMODITY RATES.

On December 14, 1906, the Commission ordered a reduction in commodity rates, and the railroad companies obtained a temporary injunction restraining the enforcement of the order.

Thereupon the legislature passed the act above mentioned, approved April 18, 1907, which established a new schedule of maximum commodity rates in all respects like that fixed by the Commission save that the reduction was not so great. The act grouped the various commodities which it embraced in several classes, for which different rates were prescribed. There was no fixed percentage relation between the classes and no regular rate of progression of the various charges with increasing distance. In other respects the method of making the schedules was similar to that adopted in the order of September 6, 1906, the hauling charge decreasing as the mileage increases.

The remaining action with respect to freight rates was taken by the Commission in the order of May 3, 1907, for the purpose of securing more favorable in-rates to a number of minor jobbing centers. It applied to certain commodities, such as groceries in

carload lots, and was supplemental to the order of September 6, 1906, being intended to re-establish the relation which had previously existed between the in-rates to these distributing points and the general schedule of class rates.

The railroad companies obeyed this order of May 3, 1907, as they had that of September 6, 1906, and they also put into effect the passenger rate of 2 cents a mile. They were about to adopt the commodity rates fixed by the act of April 18, 1907, when these suits were brought and a temporary injunction restrained them from taking that course.

The complainants assailed the acts and orders upon the grounds (1) that they amounted to an unconstitutional interference with interstate commerce, (2) that they were confiscatory and (3) that the penalties imposed for their violation were so severe as to result in a denial of the equal protection of the laws and a deprivation of property without due process of law. The jurisdiction of the Circuit Court was sustained in *Ex parte Young*, 209 U. S., 123, where it was also held that the penal provisions of the acts, operating to preclude a fair opportunity to test their validity, were unconstitutional on their face. The Circuit Court then referred the suits to a special master, who took the evidence and made an elaborate report sustaining the complainants' contentions. His findings were confirmed by the court and decrees were entered accordingly, adjudging the acts and orders (with the exception, in the case of the Minneapolis & St. Louis Railroad Co., of the order of May 3, 1907) to be void and permanently enjoining the enforcement of the prescribed rates, freight and passenger, and their adoption or maintenance by the railroad companies. 184 Fed., 765.¹

From these decrees, the attorney general of the state and the members of the Railroad and Warehouse Commission prosecute these appeals.

INTERFERENCE WITH INTERSTATE COMMERCE.

The question of the validity of the acts and orders fixing maximum rates is presented in two distinct aspects, (1) with respect to their effect on interstate commerce, and (2) as to their alleged confiscatory character.

First. As to interference with interstate commerce.

¹ For Master's findings and Judge Sanborn's decision, see *Railway Library* 1910, pp. 31-92.

None of the acts and orders prescribes rates for goods or persons moving in interstate commerce. By their terms, they apply solely to commerce that is internal. Despite this obvious purport it has been found below that the inevitable effect of the state's requirements for intrastate transportation was to impose a direct burden upon interstate commerce and to create unjust discriminations between localities in Minnesota and those in adjoining states; and hence that they must fall as repugnant to the commerce clause and to the action of Congress under it. To support its conclusion, the Circuit Court presents an impressive array of facts drawn from the approved findings of the master. (184 Fed., 775-792.) Without giving all the details they embrace, these findings may be summarized as follows:

FINDINGS OF LOWER COURT.

I. The railroad property of each of the three companies constitutes a single system. On June 30, 1906, the Northern Pacific Railway Co. (a Wisconsin corporation) operated 7,695 miles of track, of which 1,625 miles were in Minnesota. The Great Northern Railway Co. (a Minnesota corporation) at the same time operated 8,528 miles of track, of which 2,770 miles were in Minnesota. Their lines extend westerly from Superior, Wis., and Duluth, Minn., and from St. Paul and Minneapolis, through the states of Minnesota, North Dakota, Montana, Idaho, Washington and Oregon to the Pacific coast. The Minneapolis & St. Louis Railroad Co. (also a Minnesota corporation) operated 1,028 miles of track running from St. Paul and Minneapolis westerly and southerly to points in South Dakota and Iowa. In the case of each company the movement of interstate and local traffic takes place at the same time, on the same rails, with the same employes and largely by means of the same trains and cars. There has never been a separation, and it is impracticable in the exercise of fair economy to make a separation between the interstate and intrastate business in the case either of freight or of passengers. By far the larger part of the traffic is interstate. In the year 1906 the freight business of the Northern Pacific Co., local to Minnesota, was 2.67 per cent of its entire freight business and 12.33 per cent of its freight business touching the state, and its passenger business local to the state was 5.79 per cent of its entire passenger business and 67.21 per cent of its passenger business touching the state.

The conditions attending the transportation of passengers and freight are substantially the same for like distances within those portions of the states of Wisconsin, Minnesota, North Dakota and South Dakota reached by the lines of these companies, whether the transportation is interstate or wholly intrastate. Prior to the acts and orders in question, the companies had maintained rates which were relatively fair and not discriminatory as between interstate and intrastate business; and it is concluded that any substantial change in the basis of rates thus established due only to the fact that the transportation was interstate or was local to a state, and any substantial difference in rates as between the two sorts of traffic would constitute unjust discrimination in fact.

THE GEOGRAPHICAL SITUATION.

II. The state line of Minnesota on the east and west runs between cities which are in close proximity. Superior, Wisconsin, and Duluth, Minnesota, are side by side at the extremity of Lake Superior. Opposite one another, on the western boundary of the state, lie Grand Forks, N. D., and East Grand Forks, Minn.; Fargo, N. D., and Moorhead, Minn.; and Wahpeton, N. D., and Breckenridge, Minn. The cities in each pair ship and receive, to and from the same localities, the same kinds of freight. The railroad companies have always put each on a parity with the other in the matter of rates, and if there were a substantial difference it would cause serious injury to the commerce of the city having the higher rate. If the Northern Pacific Co. failed to maintain as low rates on traffic in and out of Superior as on that to and from Duluth, its power to transact interstate business between Superior and points in Minnesota would be seriously impaired and the value of its property in Superior would be depreciated.

The maximum class rates fixed by the order of September 6, 1906, were from 20 per cent to 25 per cent lower than those theretofore maintained by the Northern Pacific and Great Northern companies for transportation in Wisconsin, Minnesota and North Dakota. When the Northern Pacific Co., pursuant to this order, installed the new intrastate rates, it reduced its interstate rates between Superior and points in Minnesota to an exact parity with its rates from Duluth. Reduction was also made in the rates between both Duluth and Superior and the above mentioned points on the western boundary so as to put the border cities in North Dakota on an equal basis with the neighboring cities in Minnesota. This reduc-

tion was substantial and, had it not been made, the places adjoining the boundary, but outside the state, could not have competed with those within. Although the Northern Pacific Co. thereby suffered a substantial loss in revenue from its interstate business, it had the choice of submitting to that loss or suffering substantial destruction of its interstate commerce to these border localities in articles covered by the orders. At the same time, the Great Northern Co. made similar reductions, although, in its case, the transportation between Duluth and points in Minnesota was interstate—its line passing through Wisconsin.

III. Moorhead, Minn., Fargo and Bismarck, N. D., Billings and Butte, Mont., are so-called jobbing centers. Rates had always been accorded to them by the Northern Pacific Co. which would allow them to compete with their nearest neighbors and with St. Paul, Minneapolis and Duluth. The order of September 6, 1906, as supplemented by that of May 3, 1907, substantially reduced carload rates from the eastern terminals to Moorhead. This reduction would have given Moorhead an advantage in territory accessible to its jobbing industry not only as against Fargo, unless carload rates to Fargo were similarly reduced, but also as against Duluth, St. Paul and Minneapolis unless less-than-carload rates from these places to points accessible to Moorhead, which included a considerable territory in North Dakota, were proportionately reduced. If Fargo were protected as against Moorhead, it would have an advantage over Bismarck in territory common to them both and an advantage over the eastern terminals in territory common to them and to Fargo, unless carload rates from the eastern terminals to Bismarck and less-than-carload rates from those terminals to the territory accessible to Fargo were correspondingly reduced; and so on from distributing point to distributing point.

INFLUENCE OF TERMINAL CHARGES.

IV. Every rate comprehends two terminal charges, the initial and the final, and a haulage charge. It is declared to be a cardinal principle of rate-making that a rate for longer distance should be proportionately smaller than one for a shorter distance; for even if the haulage charge in the former case were the same per mile, the rate per ton per mile should be less for the longer haul, as the terminal charges would be spread over a greater distance. A comparison disclosed that the rates established by the order of September 6, 1906, and maintained by the Northern Pacific company be-

tween St. Paul and Moorhead were in general substantially less than the proportion of the interstate rates maintained by the company to various points in North Dakota and Montana, based on the mileage in Minnesota as compared to that of the entire haul. Maintaining such a relation of rates involves, it is found, substantial and unjust discrimination in fact against the interstate localities.

V. After the installation by the Great Northern and Northern Pacific companies of the rates prescribed by the order of September 6, 1906, it appeared that the sum of the local rates from St. Paul to Moorhead and from Moorhead to many points in North Dakota was less than the interstate rates theretofore maintained from St. Paul to these points. Both companies thereupon established rates from St. Paul to the North Dakota points as a rule no greater than the sum of the locals on Moorhead but substantially lower in general than the interstate rates in force when the order took effect. Maintaining interstate rates from St. Paul to North Dakota localities substantially greater than the sum of the locals based on the state line would have caused unjust discrimination in fact. The actual reason for the reduction in the interstate rates was to prevent transshipment at Moorhead in order to take advantage of the lower sum of the locals and to retain on its line traffic which might reach Moorhead over other lines by reason of competition, and, as to less-than-carload lots, to enable jobbers in the Twin Cities and Duluth to compete with those in Moorhead and Fargo in territory which otherwise the latter would have exclusively occupied by reason of their closer proximity.

HAULAGE CHARGE PER MILE.

VI. It is further held to be one of the fundamental dogmas of rate-making that the haulage charge per mile should not increase with increasing distance if the conditions be the same. Under the progressive decrease in the haulage charge within the state, provided by the order of September 6, 1906, 100 pounds of merchandise transported by the Northern Pacific from St. Paul to Moorhead, 248 miles, would have been hauled for 48 miles, at the rate of .98 cents per ten miles, when Moorhead is reached. If the same haulage charge of .98 cents per ten miles were applied for the remaining distance to Spokane, 1,510 miles from St. Paul (which is said to be taken as a fair example merely to illustrate the principle), it would produce a rate from St. Paul to Spokane on first-class merchandise of \$1.79 per cwt. The Interstate Commerce Commission,

in the Spokane rate case, fixed the reasonable rate on first-class merchandise from St. Paul to Spokane of \$2.50 per cwt. Maintaining this rate and the state schedule in Minnesota at the same time necessarily involves the raising of the per mile haulage charge after the Minnesota state line has been crossed, or the charge of a higher rate within Minnesota for its mileage proportion of long-haul interstate business than for business local to the state which is carried under the same conditions, and hence is found to result in unjust discrimination in fact against localities west of the Minnesota line.

VII. For more than twenty-five years the Northern Pacific Co. has maintained an equal basis of rates on merchandise between its eastern and western terminals, respectively, and Butte, Mont., and between its eastern and western terminals, respectively, and localities intermediate between them and Butte. Other railroads reaching Butte have during the same time maintained like rates to Butte from Sioux City, Omaha, St. Joseph and Kansas City on the east, and from San Francisco, Sacramento and Los Angeles on the west. Butte has been as the hub of a wheel, with spokes representing equal rates to these various cities. Industries, it is said, have been born and have grown in reliance upon this parity of rates. Intermediate points have had rates fixed in proportion to the Butte rates. Competition of markets and of carriers has brought this about. The Northern Pacific Co. cannot maintain the state rates between its eastern terminals and Moorhead and at the same time its interstate rates from its eastern terminals to Butte without substantial discrimination in fact against Butte or localities intermediate between its eastern terminals and Butte. If it lowers its rates from its eastern terminals to Butte and intermediate stations to such an extent as to obviate this discrimination, it must, to preserve the relation which has always existed, lower to a like extent its rates from its western terminals to Butte and intermediate stations. Consequently, it is found that if the Northern Pacific Co. maintains the commission-made rates between its eastern terminals and Moorhead it must either substantially discriminate in fact or destroy the general relation of rates which has existed for many years in the territory between the Missouri River and the Pacific Coast.

VIII. Prior to the taking effect of the order of September 6, 1906, the Great Northern and Northern Pacific companies had established joint through rates in connection with other carriers from all localities east or south of Minnesota to all points in Minnesota

west of St. Paul and Minneapolis. After the rates prescribed by this order were installed, the sum of the locals on St. Paul from all localities south and east of Minnesota to points in Minnesota west of St. Paul and Minneapolis, was substantially less than the then existing interstate rates for through haul to such western points. To avoid the resulting discrimination in favor of St. Paul, the companies withdrew the existing interstate rates and established a new tariff no higher than the sum of the locals on St. Paul.

INEQUALITIES OF REDUCED RATES.

IX. Further illustrations are given of inequalities resulting from the reduced Minnesota rates as compared with rates for like transportation under similar conditions into adjoining states, as, for example, from Moorhead easterly to Minnesota points and westerly into North Dakota, and also of the effects produced in the application of the state rates by reason of the difference in the distances from St. Paul, at which the state line is reached on similar hauls over different lines. As the schedule of September 6, 1906, prescribes a fixed relation between rates for different distances and different classes, the conclusion is that if the rule must be adhered to in Minnesota, it cannot be departed from substantially because of the intervention of a state line at one distance or another without involving unjust discrimination in fact.

It is found further that while, after the order of September 6, 1906, became effective, both the Great Northern and the Northern Pacific companies reduced certain interstate rates, as already mentioned, the reduction was not to such extent as to remedy the discrimination resulting from the fact that in most cases the general basis of rates within Minnesota was substantially lower than that maintained in North Dakota or upon traffic crossing the state line.

SIMILARITY OF STATE AND INTERSTATE TRAFFIC.

X. The similarity in the conditions of interstate and intrastate transportation is found also with respect to the commodities for which rates were prescribed by the act of April 18, 1907. The main lines and branches of the Northern Pacific and Great Northern companies within Minnesota and North Dakota, with the exception of certain limited tracts, lies within grain fields, and grain is shipped in substantial quantities from nearly all stations in these fields to Duluth, Minneapolis and Superior. Shipments of coal originate at the head of the lakes—that is, at Duluth or Superior—and find their

destination at all localities served by the companies in Minnesota and eastern North Dakota. Shipments of lumber originate at Duluth, Cloquet, Little Falls and other places in Minnesota, and are destined to points throughout Minnesota and North Dakota. Shipments of live stock are made in Minnesota, South Dakota and eastern Montana and go to South St. Paul or Chicago. So far as the conditions of transportation are concerned, it matters not, as to commodities moving eastwardly, whether the shipment is made in Montana, North Dakota or Minnesota or the transportation ends in Minnesota or in Wisconsin, and, as to commodities moving westwardly, whether the shipments are from Minnesota points or from Superior, or whether they find their destination in Minnesota or in North Dakota. The conclusion is that to maintain the commodity rates for transportation wholly within Minnesota simultaneously with the interstate rates now in force would involve unjust discrimination and would seriously impair the interstate business of the companies, to avoid which it would be necessary to reduce the basis of the interstate rates to a substantial parity with that prescribed by the state law. It is also stated that if the rates fixed by chapter 232 of the Laws of 1907 should become effective, the rate on shipments of wheat, with milling-in-transit privileges, from points in Minnesota via Minneapolis to Chicago, would be automatically reduced and that unless all interstate rates between Minnesota points and Chicago via interior mill towns with similar privileges should be correspondingly reduced, Minneapolis would have a substantial advantage over such towns in its interstate rates.

THE PASSENGER RATES.

XI. Prior to the act of 1907, fixing the rate of 2 cents a mile, the general basis of rates for passengers (of 12 years of age or over) between any two points on the Northern Pacific system had been for some years 3 cents a mile. After the new state rate had been installed, the sum of the locals between Moorhead and other Minnesota points and Moorhead and points westerly thereof was less than the then-existing through interstate rates. The passenger fare act took effect May 1, 1907, and in the first month thereafter the revenue for passengers on the Northern Pacific line between Moorhead and other Minnesota points increased 647 per cent over that of the corresponding month of the preceding year, while, eliminating Moorhead business, the revenue for passenger business within the state decreased 2 per cent. In June, 1907, the second month,

there were sold by the Northern Pacific Co., 4,037 tickets between St. Paul or Minneapolis, on the one hand, and Moorhead or East Grand Forks on the other, as compared with only 172 such tickets in the corresponding month of the year before; and in June, 1907, there were sold only 173 tickets between St. Paul or Minneapolis and Grand Forks and Fargo, as compared with 984 such tickets in the corresponding month of the previous year. In May and June, 1906, only one cash full fare was collected on a train from Moorhead to St. Paul or Minneapolis. In those months in 1907 there were 1,168 cash full fares and 82 cash half fares so collected. Hence, it is said, the necessary, immediate and direct effect of the law was to deprive the Northern Pacific Co. of a substantial amount of its interstate passenger business through Moorhead.

Notwithstanding the facility with which interstate passengers could avoid the discrimination against them by making two contracts with the company, it is found that discrimination in fact still existed against the interstate passenger, who, applying for a through ticket, did not know that the sum of the locals on Moorhead was less than the through rate, against the passenger with a trunk which he could not check through unless on a through ticket, and against a passenger who was compelled to use a sleeping car. The Northern Pacific Co. shortly remedied this discrimination by reducing all its interstate fares for passenger transportation through Moorhead to an amount no greater than the sum of the locals over Moorhead. Before this reduction Wisconsin had fixed the maximum passenger fare at 2 cents a mile, and North Dakota at $2\frac{1}{2}$ cents a mile. The rates thereafter established by the Northern Pacific Co. between St. Paul, for example, and points in North Dakota and beyond, and by the Northern Pacific Co. jointly with other companies for transportation between points easterly of Minnesota and points on the line of the Northern Pacific, were in general less than the previous rates by approximately 1 cent per mile for the mileage in Wisconsin and Minnesota, and by one-half cent per mile for the mileage in North Dakota. It is concluded that these reductions were compelled to avoid unjust discrimination and in order that the companies might transact interstate passenger business freely and without impairment of volume.

There are added various hypothetical calculations of the losses which would have been sustained if the basis prescribed by the state acts and orders had been applied to the interstate business and to

local business in other states. We shall have occasion later to refer to the actual results of the business of the railroad companies during the time that the rates fixed by the acts and orders (with the exception of the commodity rates) were in force, and to the effect upon revenue which the adoption of the commodity rates would have had.

The foregoing findings, as stated by the master, were made "without regard to the justness or otherwise in fact of the interstate rates so affected by such local rates." The determination of the reasonableness of the interstate rates was not deemed to be within the province of the court.

ARGUMENTS OF APPELLANTS.

The appellants do not concede the correctness of the findings in their full scope and insist upon qualifications. They deny that the evidence justified the finding that the companies had maintained "an equable, that is, relatively fair basis of rates" prior to the acts and orders in question. The general or comprehensive system of interdependent and fairly related rates, each so equitably adjusted to the others that any local change must of necessity throw the whole out of balance, is declared to exist only in imagination—to be a fiction constructed in disregard of the facts of rate-making and without attention to the inconsistencies shown by the schedules which had been in force. The actual reductions in interstate rates, which followed upon the adoption of the state tariffs, were made, it is urged, in rates voluntarily established by the companies themselves which had not been declared to be reasonable by competent authority, and in any case furnish no standard by which the validity of the action of the state, in the control of its internal affairs, should be judged. The appellants say that the local rates in Minnesota were incongruous and unreasonable; that frequent changes in the interest of favored shippers had been made through the filing of temporary intrastate tariffs until the practice was stopped by a statute of 1905 forbidding changes without the consent of the Commission; that with respect to grain and live stock, the principal agricultural products of the state, the companies maintained an "inharmomious jumble of arbitrary rates;" and that the acts and orders in question were designed to correct inequalities in the intrastate tariffs and to prescribe charges which, upon thorough investigation and after public hearings, in which the companies participated, were

found to be reasonable and were brought into suitable relation with each other by means of a scientific plan. And it is denied that unjust discrimination as against localities without the state can be predicated of the establishment of reasonable state rates.

It is also insisted that the prescribed intrastate freight rates were not in general lower than the existing interstate rates. Reference is made to the long distance traffic which, it is said, was moved within the state on proportionals of long haul rates which were much below the local rates fixed by the state. It is pointed out that the master found, in passing upon the question whether the rates were confiscatory, that the gross revenue which was derived from the intrastate freight business during the fiscal year ending June 30, 1908 (when all the rates in question were in force save the commodity rates), was greater per ton mile than that derived in the same period from the interstate business within the state, being in the case of the Northern Pacific Co. in the ratio of 1.4387 to 1 and in that of the Great Northern Co. of 2.02894 to 1. The appellants also contest the validity of the argument based on an hypothetical extension beyond the state line of the "rate of progression" for additional distance which had been prescribed by the state solely with reference to internal traffic, and they submit illustrations of incongruities which they contend would be shown by a similar extension of the rate of progression disclosed by the former intrastate tariffs of the companies. Again, it is urged that the extent of the reductions attributable to the 2-cent fare law may not be estimated properly by a comparison with the former maximum rate of 3 cents a mile. Various rates had been in force less than the maximum allowed. For the six years prior to the 2-cent fare law the average rate per passenger per mile for intrastate transportation in Minnesota, on the Northern Pacific line, had ranged from 2.299 cents in 1901 to 2.435 cents in 1905, 2.406 cents in 1906 and 2.197 cents in 1907;² and during the same time the average rate per passenger per mile for interstate transportation in Minnesota varied from 2.075 cents in 1901, 2.027 cents in 1905, 1.949 cents in 1906 and 1.981 cents in 1907.² In the fiscal year ending June 30, 1908, with the 2-cent fare law in force, the average rate per passenger per mile in Minnesota was 1.930 cents for intrastate and 1.928 cents for interstate carriage.

² The two-cent fare law was in force for two months of the fiscal year ending June 30, 1907.

SCHEDULES DISTURBED EQUILIBRIUM.

It is conceded, however, that the schedules fixed for intrastate transportation "necessarily disturbed the equilibrium theretofore existing between the rates on the two classes of business" (state and interstate) "on the boundary lines." This applies to the rates to and from the cities situated on opposite sides of the Red River of the North, the boundary between Minnesota and North Dakota and to and from Duluth and Superior on the eastern boundary. The reduction of the state rates brought them below the level of the interstate rates in those instances in which formerly both had been maintained on a parity. So, also, whatever may be said as to the non-existence of a general or comprehensive system of equitably adjusted rates, it is clear that there are competitive areas crossed by the state line of Minnesota and that the state's requirements altered the existing relation between state and interstate rates as to places within these zones of competition and not merely as to the cities on the boundary of the state.

The situation is not peculiar to Minnesota. The same question has been presented by the appeals, now before the court, which involve the validity of intrastate tariffs fixed by Missouri, Arkansas, Kentucky and Oregon. Differences in particular facts appear, but they cannot be regarded as controlling. A scheme of state rates framed to avoid discrimination between localities within the state, and to provide an harmonious system for intrastate transportation throughout the state, naturally would embrace those places within the state which are on or near the state's boundaries; and, when these are included in a general reduction of intrastate rates, there is, of course, a change in the relation of rates as theretofore existing to points adjacent to, but across the state line. Kansas City, Kan., and Kansas City, Mo.; East St. Louis, Ill., and St. Louis, Mo.; Omaha, Neb., and Council Bluffs, Ia.; Cincinnati, O., and Covington and Newport, Ky.; and many other places throughout the country which might be mentioned, present substantially the same conditions as those here appearing with respect to localities on the boundaries of Minnesota. It is also a matter of common knowledge that competition takes but little account of state lines and in every part of the land competitive districts embrace points in different states.

With appreciation of the gravity of the controversy, the railroad commissioners of eight states³ have filed their brief as amici curiæ, in support of the appeals, stating that, if the doctrine of the court below were accepted, the regulation by the states of rates for intrastate transportation would be practically destroyed. They say that "there is practically no movement of traffic between two towns within a state that does not come into competition with some interstate haul," and that "if the disturbance of the existing relation between competitive state and interstate rates is the correct criterion, no reduction can be made in state rates without interfering with interstate commerce." The governors of three states, pursuant to a resolution of a conference of the governors of all the states, have also presented, by leave of the court, their argument in defense of the position taken by Minnesota. They do not seek "to belittle the effect of the action of Minnesota on the business between the places" named in the findings, but they are convinced that if the principle announced by the Circuit Court is upheld, it can be made to apply by a showing of similar facts in virtually every state. Insisting that, under their reserved power, "the right of the states to regulate their own commerce is as clear and broad as that of Congress to regulate interstate commerce," they assail the decision below, not upon the ground that it incorrectly sets forth conditions in Minnesota and adjoining states, but for what they consider to be "its plain disregard of the provisions of the federal constitution, which establish the relations between the nation and the states." "The operation of these provisions," they maintain, "was not made to depend on geography or convenience or competition. They cannot apply in one state and not in another, according to circumstances as they may be found by the courts, because they are vital principles which constitute the very structure of our dual form of government."

SCOPE OF FEDERAL LEGISLATION.

The controversy thus arises from opposing conceptions of the fundamental law, and of the scope and effect of federal legislation, rather than from differences with respect to the salient facts.

For the purpose of the present inquiry, the rates fixed by the state must be assumed to be reasonable rates so far as intrastate traffic is concerned; that is, they must be taken to be rates which

³ Nebraska, Iowa, Kansas, South Dakota, North Dakota, Oklahoma, Missouri and Texas.

the state, in the exercise of its legislative judgment, could constitutionally fix for intrastate transportation separately considered. If the state rates are not of this character—a question to be dealt with later—they cannot be sustained in any event; but, assuming them to be otherwise valid, the decree below, with respect to the present branch of the case, rests upon two grounds: (1) That the action of the state imposes a direct burden upon interstate commerce; and (2) that it is in conflict with the provisions of the act to regulate commerce.

These grounds are distinct. If a state enactment imposes a direct burden upon interstate commerce, it must fall regardless of federal legislation. The point of such an objection is not that Congress has acted, but that the state has directly restrained that which in the absence of federal regulation should be free. If the acts of Minnesota constitute a direct burden upon interstate commerce, they would be invalid without regard to the exercise of federal authority touching the interstate rates said to be affected. On the other hand, if the state, in the absence of federal legislation, would have had the power to prescribe the rates here assailed, the question remains whether its action is void as being repugnant to the statute which Congress has enacted.

Prior to the passage of the act to regulate commerce, carriers fixed their interstate rates free from the actual exertion of federal control; and under that act, as it stood until the amendment of June 29, 1906, the Interstate Commerce Commission had no power to prescribe interstate rates. The states, however, had long exercised the power to establish maximum rates for intrastate transportation. Was this power, apart from federal action, subject to the limitation that the state could not fix intrastate rates, reasonable as such, generally throughout the state, but only as to such places and in such circumstances that the interstate business of the carriers would not be thereby affected? That is, was the state debarred from fixing reasonable rates on traffic, wholly internal, as to all state points so situated that as a practical consequence the carriers would have to reduce the rates they had made to competing points without the state, in order to maintain the volume of their interstate business or to continue the parity of rates or the relation between rates as it had previously existed? Was the state, in prescribing a general tariff of reasonable intrastate rates otherwise within its authority bound not to go below a minimum standard established by the in-

terstate rates made by the carriers within competitive districts? If the state power, independently of federal legislation, is thus limited, the inquiry need proceed no further. Otherwise it must be determined whether Congress has so acted as to create such a restriction upon the state authority theretofore existing.

GENERAL PRINCIPLES OF STATE AUTHORITY.

(1) The general principles governing the exercise of state authority when interstate commerce is affected are well established. The power of Congress to regulate commerce among the several states is supreme and plenary. It is "complete in itself, may be exercised to its utmost extent, and acknowledges no limitations, other than are prescribed in the constitution." *Gibbons vs. Ogden*, 9 Wheat. 1, 196. The conviction of its necessity sprang from the disastrous experiences under the Confederation when the states vied in discriminatory measures against each other. In order to end these evils, the grant in the constitution conferred upon Congress an authority at all times adequate to secure the freedom of interstate commercial intercourse from state control and to provide effective regulation of that intercourse as the national interest may demand. The words "among the several states" distinguish between the commerce which concerns more states than one and that commerce which is confined within one state and does not affect other states. "The genius and character of the whole government," said Chief Justice Marshall, "seem to be, that its action is to be applied to all the external concerns of the nation, and to those internal concerns which affect the states generally; but not to those which are completely within a particular state, which do not affect other states, and with which it is not necessary to interfere, for the purpose of executing some of the general powers of the government. The completely internal commerce of a state, then, may be considered as reserved for the state itself." (*Id.* p. 195.) This reservation to the states manifestly is only of that authority which is consistent with and not opposed to the grant to Congress. There is no room in our scheme of government for the assertion of state power in hostility to the authorized exercise of federal power. The authority of Congress extends to every part of interstate commerce, and to every instrumentality or agency by which it is carried on; and the full control by Congress of the subjects committed to its regulation is not to be denied or thwarted by the commingling of interstate and intrastate operations. This is not to say that the nation

may deal with the internal concerns of the state, as such, but that the execution by Congress of its constitutional power to regulate interstate commerce is not limited by the fact that intrastate transactions may have become so interwoven therewith that the effective government of the former incidentally controls the latter. This conclusion necessarily results from the supremacy of the national power within its appointed sphere.

The grant in the constitution of its own force, that is, without action by Congress, established the essential immunity of interstate commercial intercourse from the direct control of the states with respect to those subjects embraced within the grant which are of such a nature as to demand that, if regulated at all, their regulation should be prescribed by a single authority. It has repeatedly been declared by this court that as to those subjects which require a general system or uniformity of regulation the power of Congress is exclusive. In other matters, admitting of diversity of treatment according to the special requirements of local conditions, the states may act within their respective jurisdictions until Congress sees fit to act; and, when Congress does act, the exercise of its authority overrides all conflicting state legislation.

The principle, which determines this classification, underlies the doctrine that the states cannot under any guise impose direct burdens upon interstate commerce. For this is but to hold that the states are not permitted directly to regulate or restrain that which from its nature should be under the control of the one authority and be free from restriction save as it is governed in the manner that the national legislature constitutionally ordains.

WHAT THE STATES CANNOT DO.

Thus, the states cannot tax interstate commerce, either by laying the tax upon the business which constitutes such commerce or the privilege of engaging in it, or upon the receipts, as such, derived from it. They have no power to prohibit interstate trade in legitimate articles of commerce or to exclude from the limits of the state corporations or others engaged in interstate commerce or to fetter by conditions their right to carry it on; or to prescribe the rates to be charged for transportation from one state to another, or to subject the operations of carriers in the course of such transportation to requirements that are unreasonable or pass beyond the bounds of suitable local protection.

POWER REMAINING TO THE STATES.

But within these limitations there necessarily remains to the states, until Congress acts, a wide range for the permissible exercise of power appropriate to their territorial jurisdiction although interstate commerce may be affected. It extends to those matters of a local nature as to which it is impossible to derive from the constitutional grant an intention that they should go uncontrolled pending federal intervention. Thus, there are certain subjects having the most obvious and direct relation to interstate commerce, which nevertheless, with the acquiescence of Congress, have been controlled by state legislation from the foundation of the government because of the necessity that they should not remain unregulated and that their regulation should be adapted to varying local exigencies; hence, the absence of regulation by Congress in such matters has not imported that there should be no restriction but rather that the states should continue to supply the needed rules until Congress should decide to supersede them. Further, it is competent for a state to govern its internal commerce, to provide local improvements, to create and regulate local facilities, to adopt protective measures of a reasonable character in the interest of the health, safety, morals and welfare of its people, although interstate commerce may incidentally or indirectly be involved. Our system of government is a practical adjustment by which the national authority as conferred by the constitution is maintained in its full scope without unnecessary loss of local efficiency. Where the subject is peculiarly one of local concern, and from its nature belongs to the class with which the state appropriately deals in making reasonable provision for local needs, it cannot be regarded as left to the unrestrained will of individuals because Congress has not acted, although it may have such a relation to interstate commerce as to be within the reach of the federal power. In such case, Congress must be the judge of the necessity of federal action. Its paramount authority always enables it to intervene at its discretion for the complete and effective government of that which has been committed to its care, and, for this purpose, and to this extent, in response to a conviction of national need, to displace local laws by substituting laws of its own. The successful working of our constitutional system has thus been made possible.

PROVISION OF LOCAL IMPROVEMENTS.

A state is entitled to protect its coasts, to improve its harbors, bays and streams, and to construct dams and bridges across navigable rivers within its limits, unless there is conflict with some act of Congress. Plainly, in the case of dams and bridges, interference with the accustomed right of navigation may result. But this exercise of the important power to provide local improvements has not been regarded as constituting such a direct burden upon intercourse or interchange of traffic as to be repugnant to the federal authority in its dormant state. Thus, in *Gilman vs. Philadelphia*, 3 Wall. 713, the complainants were the owners of a valuable wharf and dock property in the Schuylkill River and sought to prevent the construction of a bridge which had been authorized by the legislature of Pennsylvania to connect East and West Philadelphia. It appeared that the bridge would prevent the passage of vessels having masts which had formerly navigated the river up to the complainants' wharf, and would largely reduce the income from the property. The court affirmed the dismissal of the bill upon the ground that in the absence of legislation by Congress the state was acting within its authority. "The states have always exercised this power," said the court (*id.* p. 729), "and from the nature and objects of the two systems of government they must always continue to exercise it, subject, however, in all cases, to the paramount authority of Congress, whenever the power of the states shall be exerted within the sphere of the commercial power which belongs to the nation." Again, in *Escanaba Co. vs. Chicago*, 107 U. S. 678, the question related to the power of the city of Chicago, acting under the authority of the state, to regulate the closing of draws in the bridges over the Chicago River. The court said: "The Chicago River and its branches must . . . be deemed navigable waters of the United States, over which Congress under its commercial power may exercise control to the extent necessary to protect, preserve and improve their free navigation. But the states have full power to regulate within their limits matters of internal police, including in that general designation, whatever will promote the peace, comfort, convenience and prosperity of their people. This power embraces the construction of roads, canals and bridges, and the establishment of ferries, and it can generally be exercised more wisely by the states than by a distant authority . . . When its (the state's) power is exercised, so as to unnecessarily

obstruct the navigation of a river or its branches, Congress may interfere and remove the obstruction. . . . But until Congress acts on the subject, the power of the state over bridges across its navigable streams is plenary." (Id. p. 683.)

State inspection laws and statutes designed to safeguard the inhabitants of a state from fraud and imposition are valid when reasonable in their requirements and not in conflict with federal rules, although they may affect interstate commerce in their relation to articles prepared for export or by including incidentally those brought into the state and held for sale in the original imported packages.

CARRIERS ANSWERABLE TO STATE LAWS.

Interstate carriers, in the absence of federal statute providing a different rule, are answerable according to the law of the state for nonfeasance or misfeasance within its limits. Until the enactment by Congress of the act of April 22, 1908, c. 149, 35 Stat. 65, the laws of the states determined the liability of interstate carriers by railroad for injuries received by their employes while engaged in interstate commerce, and this was because Congress, although empowered to regulate the subject, had not acted thereon. In some states the so-called fellow-servant rule obtained; in others, it had been abrogated; and it remained for Congress, in this respect and in other matters specified in the statute, to establish a uniform rule. So, where Congress has not intervened, state statutes providing damages for wrongful death may be enforced not only against land carriers, but also against the owners of vessels engaged in interstate commerce where the wrong occurs within the jurisdiction of the state. And, until Congress legislated on the matter, liability for loss of property, on interstate as well as intrastate shipments, was subject to state regulation. Some states allowed an exemption by contract from all or a part of the common law liability; others allowed no exemption. These differences in the applicable laws created inequalities with respect to interstate transportation, but each state exercised the power inherent in its territorial jurisdiction, and the remedy for the resulting diversity lay with Congress, which was free to substitute its own regulations; and this was done in the recent amendment of section 20 of the act to regulate commerce. Act of June 29, 1906, c. 3591, 34 Stat. 584. It is within the competency of a state to create and enforce liens upon vessels for supplies furnished under contracts not maritime in their nature,

and it is no valid objection that the state law may obstruct the prosecution of a voyage of an interstate character. It may also create liens for damages to property on land occasioned by negligence of vessels. Cars employed in interstate commerce may be seized by attachment under state law, in order to compel the payment of debts. And the legislation of the states, safeguarding life and property and promoting comfort and convenience within its jurisdiction, may extend incidentally to the operations of the carrier in the conduct of interstate business, provided it does not subject that business to unreasonable demands and is not opposed to federal legislation. It has also been held that the state has the power to forbid the consolidation of state railroad corporations with competing lines, although both may be interstate carriers and the prohibition may have a far-reaching effect upon interstate commerce.

Again, it is manifest that when the legislation of the state is limited to internal commerce to such degree that it does not include even incidentally the subjects of interstate commerce, it is not rendered invalid because it may affect the latter commerce indirectly. In the intimacy of commercial relations, much that is done in the superintendence of local matters may have an indirect bearing upon interstate commerce. The development of local resources and the extension of local facilities may have a very important effect upon communities less favored and to an appreciable degree alter the course of trade. The freedom of local trade may stimulate interstate commerce, while restrictive measures within the police power of the state enacted exclusively with respect to internal business, as distinguished from interstate traffic, may in their reflex or indirect influence diminish the latter and reduce the volume of articles transported into or out of the state. It was an objection of this sort that was urged and overruled in *Kidd vs. Pearson*, 128 U. S. 1, to the law of Iowa prohibiting the manufacture and sale of liquor within the state, save for limited purposes. When, however, the state in dealing with its internal commerce undertakes to regulate instrumentalities which are also used in interstate commerce, its action is necessarily subject to the exercise by Congress of its authority to control such instrumentalities so far as may be necessary for the purpose of enabling it to discharge its constitutional function.

SUMMARY OF STATE POWERS.

Within the state power, then, in the words of Chief Justice Marshall, is "that immense mass of legislation, which embraces

everything within the territory of a state, not surrendered to the general government; all which can be most advantageously exercised by the states themselves. Inspection laws, quarantine laws, health laws of every description, as well as laws for regulating the internal commerce of a state, and those which respect turnpike roads, ferries, etc., are component parts of this mass. No direct general power over these objects is granted to Congress; and, consequently, they remain subject to state legislation. If the legislative power of the union can reach them, it must be for national purposes; it must be where the power is expressly given for a special purpose, or is clearly incidental to some power which is expressly given."

And, wherever as to such matters, under these established principles, Congress may be entitled to act, by virtue of its power to secure the complete government of interstate commerce, the state power nevertheless continues until Congress does act, and by its valid interposition limits the exercise of the local authority.

STATE MAY PRESCRIBE RATES.

(2) These principles apply to the authority of the state to prescribe reasonable maximum rates for intrastate transportation.

State regulation of railroad rates began with railroad transportation. The railroads were chartered by the states and from the outset, in many charters, maximum rates for freight or passengers, or both were prescribed. Frequently—and this became general practice—the board of directors was permitted to fix charges in its discretion, an authority which in numerous instances was made subject to a limitation upon the amount of net earnings. In several states maximum rates were also established, or the power to alter rates was expressly reserved, by general laws. In 1853, the state of New York fixed the maximum fare for way passengers on the railroads forming the line of the New York Central at two cents a mile and this rate extending to Buffalo and Suspension Bridge, on the boundary of the state, has continued to the present day. As a rule the restrictions imposed by the early legislation were far from onerous, but they are significant in the assertion of the right of control. More potent than these provisions, in the actual effect upon railroad tariffs, was the state canal. It is a matter of common knowledge that the traffic on the trunk lines from the Atlantic seaboard to the west was developed in competition with the Erie Canal, built, maintained and regulated by the state of New York to promote its commerce.

The authority of the state to limit by legislation the charges of common carriers within its borders was not confined to the power to impose limitations in connection with grants of corporate privileges. In view of the nature of their business, they were held subject to legislative control as to the amount of their charges unless they were protected by their contract with the state. This was decided in numerous cases, following *Munn vs. Illinois*, 94 U. S. 113. The question was presented by acts of the legislatures of Illinois, Iowa, Wisconsin and Minnesota, passed in the years 1871 and 1874 in response to a general movement for a reduction of rates. The section of the country in which the demand arose was to a large degree homogeneous and one in which the flow of commerce was only slightly concerned with state lines. But resort was had to the states for relief. In the *Munn* case, the court had before it the statute of Illinois governing the grain warehouses in Chicago. Through these elevators, located with the river harbor on the one side and the railway tracks on the other, it was necessary according to the course of trade for the product of seven or eight states of the West to pass on its way to the states on the Atlantic coast. In addition to the denial of any legislative authority to limit charges it was urged that the act was repugnant to the exclusive power of Congress to regulate interstate commerce. The court answered that the business was carried on exclusively within the limits of the state of Illinois, that its regulation was a thing of domestic concern and that "certainly, until Congress acts in reference to their interstate relations, the state may exercise all the powers of government over them, even though in so doing it may indirectly operate upon commerce outside its immediate jurisdiction." In the decision of the railroad cases, above cited, the same opinion was expressed. The language of the court, however, went further than to sustain the state law with respect to rates for purely intrastate carriage. Thus, the act of Wisconsin covered traffic which started within the state and was destined to points outside, and this was treated as being within the state power (*Peik vs. Chicago & Northwestern Ry. Co.*, 94 U. S. 164, 177, 178), a view which was later repudiated. *Wabash, etc., Ry. Co. vs. Illinois*, 118 U. S. 557.

POWERS OF STATE COMMISSIONS.

It became a frequent practice for the states to create commissions, as agencies of state supervision and regulation, and in many instances the rate-making power was conferred upon these bodies.

A summary of such legislation is given in *Interstate Commerce Commission vs. C., N. O. & T. P. Ry. Co.*, 167 U. S. 479, 495, 496. One of these state laws, that of Mississippi, passed in 1884, came under review in *Stone vs. Farmers Loan & Trust Co.*, 116 U. S. 307. The suit was brought to enjoin the railroad commission from enforcing the statute against the *Mobile & Ohio Railroad Co.* It had been incorporated in the states of Alabama, Mississippi, Tennessee and Kentucky, for the purpose of constructing a railroad from Mobile to some point near the mouth of the Ohio River where it would connect with another railroad, thus forming a continuous line of interstate communication between the Gulf of Mexico and the Great Lakes. The commission as yet has not acted. Sustaining the state power to fix rates upon traffic wholly internal, the court directed the dismissal of the bill. The state, said the court, "may, beyond all question, by the settled rule of decision in this court, regulate freights and fares for business done exclusively within the state, and it would seem to be a matter of domestic concern to prevent the company from discriminating against persons and places in Mississippi." In the same case, it was declared that the power of regulation was not a power to confiscate; and that under pretense of regulating fares and freights, the states could not "require a railroad corporation to carry persons or property without reward," or do that which in law amounted "to a taking of private property for public use without just compensation, or without due process of law." (Id. p. 331.)

LIMITATION OF STATE AUTHORITY.

In *Wabash, etc., Ry. Co. vs. Illinois*, supra, it was finally determined that the authority of the state did not extend to the regulation of charges for interstate transportation. There the state statute was aimed at discrimination. It was said to have been violated by the railroad company in the case of shipments from points within Illinois to the city of New York. The state court had construed the statute to be binding as to that part of the interstate haul which was within the state although inoperative beyond the boundary. So applied, this court held the act to be invalid.

But no doubt was entertained of the state's authority to regulate rates for transportation that was wholly intrastate. And, in illustrating the extent of state power (id. p. 564), the court selected transportation across the state from Cairo to Chicago and from Chicago to Alton, all boundary points constituting important cen-

ters of commerce—the one on Lake Michigan, and the others at the confluence of the Mississippi and Ohio Rivers, and of the Mississippi and Missouri Rivers, respectively. After reviewing decisions holding state laws to be ineffective which imposed a direct burden upon interstate commerce, the court emphasized the distinction with respect to the operation of the statute upon domestic transactions, saying: “Of the justice or propriety of the principle which lies at the foundation of the Illinois statute, it is not the province of this court to speak. As restricted to a transportation which begins and ends within the limits of the state it may be very just and equitable, and it certainly is the province of the state legislature to determine that question.” (Id. p. 577.)

The doctrine was thus fully established that the state could not prescribe interstate rates, but could fix reasonable intrastate rates throughout its territory. The extension of railroad facilities has been accompanied at every step by the assertion of this authority on the part of the states and its invariable recognition by this court. It has never been doubted that the state could, if it saw fit, build its own highways, canals and railroads. It could build railroads traversing the entire state and thus join its border cities and commercial centers by new highways of internal intercourse to be always available upon reasonable terms. Such provision for local traffic might indeed alter relative advantages in competition, and, by virtue of economic forces, those engaged in interstate trade and transportation might find it necessary to make readjustments extending from market to market through a wide sphere of influence; but such action of the state would not for that reason be regarded as creating a direct restraint upon interstate commerce and as thus transcending the state power. Similarly, the authority of the state to prescribe what shall be reasonable charges of common carriers for intrastate transportation, unless it be limited by the exertion of the constitutional power of Congress, is state-wide. As a power appropriate to the territorial jurisdiction of the state, it is not confined to a part of the state, but extends throughout the state—to its cities adjacent to its boundaries as well as to those in the interior of the state. To say that this power exists, but that it may be exercised only in prescribing rates that are on an equal or higher basis than those that are fixed by the carrier for interstate transportation, is to maintain the power in name while denying it in fact. It is to assert that the exercise of the legislative judgment in

determining what shall be the carrier's charge for the intrastate service is itself subject to the carrier's will. But this state-wide authority controls the carrier and is not controlled by it; and the idea that the power of the state to fix reasonable rates for its internal traffic is limited by the mere action of the carrier in laying an interstate rate to places across the state's border, is foreign to our jurisprudence.

CONGRESS LIMITED ITS OWN SCOPE.

If this authority of the state be restricted, it must be by virtue of the paramount power of Congress over interstate commerce and its instruments; and, in view of the nature of the subject, a limitation may not be implied because of a dormant federal power, that is, one which has not been exerted, but can only be found in the actual exercise of federal control in such measure as to exclude this action by the state which otherwise would clearly be within its province.

(3) When Congress, in the year 1887, enacted the act to regulate commerce (24 Stat., 379), it was acquainted with the course of the development of railroad transportation and with the exercise by the states of the rate-making power. An elaborate report had been made to the Senate by a committee authorized to investigate the subject of railroad regulation in which the nature and extent of state legislation, including the commission plan, were fully reviewed (Senate Report 46, submitted January 6, 1886, 49th Congress, 1st session). And it was the fact that beyond the bounds of state control there lay a vast field of unregulated activity in the conduct of interstate transportation which was found to be the chief cause of the demand for federal action.

Congress carefully defined the scope of its regulation, and expressly provided that it was not to extend to purely intrastate traffic. In the first section of the act to regulate commerce there was inserted the following proviso:

"Provided, however, That the provisions of this act shall not apply to the transportation of passengers or property, or to the receiving, delivering, storage or handling of property, wholly within one state, and not shipped to or from a foreign country or to any state or territory aforesaid."

When in the year 1906 (act of June 29, 1906, c. 3591, 34 Stat., 584) Congress amended the act so as to confer upon the federal commission power to prescribe maximum interstate rates, the pro-

viso in section 1 was re-enacted. Again, in 1910, when the act was extended to embrace telegraph, telephone and cable companies engaged in interstate business, the proviso was once more re-enacted, with an additional clause so as to exclude the intrastate messages from the operation of the statute. (Act of June 18, 1910, c. 309, 36 Stat., 545.) The proviso in its present form reads:

“Provided, however, That the provisions of this act shall not apply to the transportation of passengers or property or to the receiving, delivering, storage or handling of property wholly within one state and not shipped to or from a foreign country from or to any state or territory as aforesaid, nor shall they apply to the transmission of messages by telephone, telegraph or cable wholly within one state and not transmitted to or from a foreign country from or to any state or territory as aforesaid.”

There was thus excluded from the provisions of the act that transportation which was “wholly within one state,” with the specified qualification where its subject was going to or coming from a foreign country.

It is urged, however, that the words of the proviso are susceptible of a construction which would permit the provisions of section three of the act, prohibiting carriers from giving an undue or unreasonable preference or advantage to any locality, to apply to unreasonable discriminations between localities in different states, as well when arising from an intrastate rate as compared with an interstate rate as when due to interstate rates exclusively. If it be assumed that the statute should be so construed, and it is not necessary now to decide the point, it would inevitably follow that the controlling principle governing the enforcement of the act should be applied to such cases as might thereby be brought within its purview; and the question whether the carrier, in such a case, was giving an undue or unreasonable preference or advantage to one locality as against another, or subjecting any locality to an undue or unreasonable prejudice or disadvantage, would be primarily for the investigation and determination of the Interstate Commerce Commission and not for the courts. The dominating purpose of the statute was to secure conformity to the prescribed standards through the examination and appreciation of the complex facts of transportation by the body created for that purpose; and, as this court has repeatedly held, it would be destructive of the system of regulation defined by the statute if the court, without the preliminary action of the Commission, were

to undertake to pass upon the administrative questions which the statute has primarily confided to it. In the present case, there has been no finding by the Interstate Commerce Commission of unjust discrimination violative of the act; and no action of that body is before us for review.

The question we have now before us, essentially, is whether, after the passage of the Interstate Commerce Act, and its amendment, the state continued to possess the state-wide authority which it formerly enjoyed to prescribe reasonable rates for its exclusively internal traffic. That, as it plainly appears, was the nature of the action taken by Minnesota, and the attack, however phrased, upon the rates here involved as an interference with interstate commerce, is in substance a denial of that authority.

COMMERCE ACT CONTEMPLATED NO INTERFERENCE WITH STATE
CONTROL.

Having regard to the terms of the federal statute, the familiar range of state action at the time it was enacted, the continued exercise of state authority in the same manner and to the same extent after its enactment, and the decisions of this court recognizing and upholding this authority, we find no foundation for the proposition that the Act to regulate commerce contemplated interference therewith.

Congress did not undertake to say that the intrastate rates of interstate carriers should be reasonable or to invest its administrative agency with authority to determine their reasonableness. Neither by the original act nor by its amendment, did Congress seek to establish a unified control over interstate and intrastate rates; it did not set up a standard for intrastate rates, or prescribe, or authorize the Commission to prescribe, either maximum or minimum rates for intrastate traffic. It cannot be supposed that Congress sought to accomplish by indirection that which it expressly disclaimed, or attempted to over-ride the accustomed authority of the states without the provision of a substitute. On the contrary, the fixing of reasonable rates for intrastate transportation was left where it had been found; that is, with the states and the agencies created by the states to deal with that subject.

How clear was the purpose not to occupy the field thus left to the exercise of state power is shown by the clause uniformly inserted in the numerous acts passed by Congress to authorize the construction of railways across the Indian Territory. This clause,

while fixing a maximum passenger rate, made the laws of an adjoining state (in some cases Arkansas, in others Texas, and in others Kansas) applicable to the freight rates to be charged within the territory; and while the right to regulate rates on the authorized line of railroad was reserved to Congress until a state government should be established, it was expressly provided that, when established, the state should be entitled to fix rates for intrastate transportation—the right remaining with Congress to prescribe rates for such transportation as should be interstate. Within a month after the Act to regulate commerce was enacted, two acts were passed by Congress for this purpose with respect to railways extending across the territory from the Texas to the Kansas boundary. The provision—in both cases in identical language—save that the one referred to the laws of Texas and the other to the laws of Kansas—was as follows:

Sec. 4. That said railroad company shall not charge the inhabitants of said territory a greater rate of freight than the rate authorized by the laws of the state of Texas for services or transportation of the same kind; Provided, That passenger rates on said railway shall not exceed three cents per mile. Congress hereby reserves the right to regulate the charges for freight and passengers on said railway, and messages on said telegraph and telephone lines, until a state government or governments shall exist in said territory within the limits of which said railway, or a part thereof, shall be located; and then such state government or governments shall be authorized to fix and regulate the cost of transportation of persons and freights within their respective limits by said railway; but Congress expressly reserves the right to fix and regulate at all times the cost of such transportation by said railway or said company whenever such transportation shall extend from one state into another, or shall extend into more than one state; Provided, however, That the rate of such transportation of passengers, local or interstate, shall not exceed the rate above expressed; And provided further, That said railway company shall carry the mail at such prices as Congress may by law provide; and until such rate is fixed by law the Postmaster-General may fix the rate of compensation.

STATE LAWS CITED.

The same provision is found in similar statutes passed in almost every year from 1884 to 1902 and relating to lines intended to serve as highways of interstate communication. When Oklahoma became

a state the laws of other states which were referred to in these various acts ceased to be operative within its limits, and by virtue of its statehood and with the direct sanction of Congress, it became authorized to prescribe reasonable maximum rates for intrastate transportation throughout its extent.

PREVIOUS DECISIONS OF THE COURT.

The decisions of this court since the passage of the Act to regulate commerce have uniformly recognized that it was competent for the state to fix such rates, applicable throughout its territory. If it be said that in the contests that have been waged over state laws during the past 25 years, the question of interference with interstate commerce by the establishment of state-wide rates for intrastate traffic has seldom been raised, this fact itself attests the common conception of the scope of state authority. And the decisions recognizing and defining the state power wholly refute the contention that the making of such rates either constitutes a direct burden upon interstate commerce or is repugnant to the Federal statute.

In *Dow vs. Beidelman*, 125 U. S., 680, the statute of Arkansas, enacted in April, 1887, which established three cents a mile as the maximum fare for carrying passengers within the state on railroads over 75 miles in length, was sustained against the objection of the owners of the Memphis & Little Rock Railroad, who attacked the act as confiscatory and arbitrary in its classification. The same statute was again upheld in *St. Louis & San Francisco Railway Co. vs. Gill*, 156 U. S. 649. In *Chicago, etc., Railway Co. vs. Minnesota*, 134 U. S. 418 the statute of that state (1887) creating a commission with power to prescribe the intrastate rates was adjudged to be invalid, but this was upon the ground that the act as construed by the state court made the rates published by the commission final and conclusive and precluded any judicial inquiry whether they were reasonable. In *Chicago, etc., Railway Co. vs. Wellman*, 143 U. S., 339, the act of the legislature of Michigan (1889) fixing the maximum fare for passengers within the state at two cents a mile in the case of companies whose gross earnings exceeded \$3,000 a mile was unsuccessfully assailed as confiscatory, and no contention was advanced that such an act operating throughout the state was an unwarrantable interference with interstate commerce.

In *Reagan vs. Farmers Loan & Trust Co.*, 154 U. S., 362, the trustee of a railroad mortgage attacked the statute of Texas (1891)

which established a railroad commission with authority to regulate tariffs, and the order of the commission providing a schedule of classified rates for the transportation of goods within the state. The challenge was of the tariff as a whole and the inquiry was whether the body of rates was unreasonable and such as to work a practical destruction of rights of property. Viewed in this aspect, the court, upon the allegations admitted by demurrer, held the action of the commission to be beyond its constitutional power and affirmed the decree of the Circuit Court enjoining the rates. The decree, however, was reversed so far as it restrained the commission from discharging the duties imposed by the statute and from proceeding to prescribe reasonable rates and regulations. A further question was presented in *Reagan vs. Mercantile Trust Co.*, 154 U. S., 413, in respect to the same statute and order as applied to the *Texas & Pacific Railway Co.*, which had been organized under the laws of the United States (16 Stat., 573) and operated its road not only within that state, but also for several hundred miles outside. It was insisted that this company was "not subject to the control of the state, even as to rates for transportation wholly within the state," the argument being that it was not within the state power to limit the Federal franchise to collect tolls. But the court held that the act of Congress did not go to the extent asserted but left the company, as to its intrastate business, subject to state authority.

SMYTH VS. AMES.

The effect of intrastate rates upon interstate rates was urged in *Smyth vs. Ames*, 169 U. S., 466, and in the cases decided therewith. These suits were brought by stockholders of the *Union Pacific Railway Co.*, the *Chicago & Northwestern Railroad Co.*, and the *Chicago, Burlington & Quincy Railroad Co.*, to enjoin the enforcement of the act of the legislature of Nebraska passed in 1893. This was a comprehensive statute classifying the freight transported from any point in Nebraska to any other point in that state and prescribing tables of maximum rates. The companies affected were interstate carriers engaged in a vast commerce, only a small portion of which was wholly local to the state. On the western boundary lay Omaha, a city of large importance in interstate trade, situated on the Missouri River, with Council Bluffs, in the state of Iowa, directly opposite. The point was distinctly made in the Circuit Court that the statute interfered with interstate commerce because, first, it established a classification of freights differ-

ent from that which prevailed west of Chicago, and, second, by reducing local rates it necessarily reduced rates on interstate business. Mr. Justice Brewer, who tried the cases, over-ruled these objections, holding that neither the convenience of the carriers nor the consequences of competition, with respect to interstate rates, could be pleaded "In restraint of the otherwise undeniable power of the state." Having disposed of this contention, the court considered the question of the reasonableness of the rates, and reached the conclusion that they were invalid because they amounted to a deprivation of the carriers' rights of property. On appeal to this court the counsel for the appellees directed attention to the conditions of transportation in Nebraska. It was argued that the local traffic was carried over the same tracks, in the same trains and often in the same cars with the interstate traffic; that to separate the cost of carrying the one sort of traffic from that of the other was a "manifest impossibility;" and that it was a necessary consequence of existing conditions that, if Nebraska controlled the local rates, it at the same time controlled the interstate rates. But this contention was not sustained, and the affirmance of the decree was placed upon the distinct ground that the rates were confiscatory. It was ruled that the reasonableness of intrastate rates was to be determined by considering the intrastate business separately. In answer to the suggestion that the conditions of business might have changed for the better since the decrees, the court called attention to the proviso in the decrees intended to meet such a case, adding that if the Circuit Court found that conditions were such as to permit the application of the state rates without depriving the carriers of just compensation it would "be its duty to discharge the injunction" and to make whatever order was necessary "to remove any obstruction placed by the decrees in these cases in the way of the enforcement of the statute."

In that one of the Smyth cases which was brought by the stockholders of the Union Pacific Railway Co. not only was the case presented of a trunk line crossing the state with a relatively small proportion of business local to Nebraska, but the company had been formed by a consolidation of several companies by authority of Congress, one of them being the Union Pacific Railroad Co., incorporated by the act of July 1, 1862, c. 120, 12 Stat., 489. By this act it was expressly provided that Congress might reduce the rates of fare if unreasonable and might fix the same by law whenever

the net earnings of the entire road and telegraph should exceed a certain amount. But this language, while showing that Congress intended to reserve the power to prevent unreasonable exactions, was not deemed to be equivalent to a declaration that the states through which the road might be constructed should not regulate rates for intrastate transportation. The court said: "It cannot be doubted that the making of rates for transportation by railroad corporations along public highways, between points wholly within the limits of a state, is a subject primarily within the control of that state. * * * Congress not having exerted this power, we do not think that the national character of the corporation constructing the Union Pacific Railroad stands in the way of a state prescribing rates for transporting property on that road wholly between points within its territory. Until Congress, in the exercise either of the power specifically reserved by the eighteenth section of the act of 1862 or its power under the general reservation made of authority to add to, alter, amend or repeal that act, prescribes rates to be charged by the railroad company, it remains with the states through which the road passes to fix the rates for transportation beginning and ending within their respective limits." It is plain that had the intrastate rates, established by the comprehensive statute of Nebraska, not been found to be confiscatory they would have been sustained in their application to all intrastate traffic, notwithstanding the reserved power of Congress over the Union Pacific line and despite the argument based upon the interdependence of interstate and intrastate rates.

INTERFERENCE REMOTE.

The cases of *Louisville & Nashville Railroad Co. vs. Kentucky*, 183 U. S., 503, and *Louisville & Nashville Railroad Co. vs. Eubank*, 184 U. S., 27, concerned the validity of the long-and-short-haul provision of the constitution of Kentucky adopted in 1891. In the first case, violation was charged with respect to the transportation of coal from Altamont to Lebanon, an intermediate station, as compared with charges for transportation from Altamont to Elizabethtown and Louisville, all places being within Kentucky. The difference in rate was justified by the company on the ground that at Louisville the coal hauled from Altamont came into competition with that brought down the Ohio River, and at Elizabethtown with western Kentucky coal brought there by the Illinois Central Railroad. The contention that the state provision operated as

an interference with interstate commerce was presented and overruled, the court saying: "It is plain that the provision in question does not in terms embrace the case of interstate traffic. It is restricted in its regulation to those who own or operate a railroad within the state, and the long and short distances mentioned are evidently distances upon the railroad line within the state. The particular case before us is one involving only the transportation of coal from one point in the state of Kentucky to another by a corporation of that state. It may be that the enforcement of the state regulation forbidding discrimination in rates in the case of articles of a like kind carried for different distances over the same line may somewhat affect commerce generally; but we have frequently held that such a result is too remote and indirect to be regarded as an interference with interstate commerce; that the interference with the commercial power of the general government to be unlawful must be direct, and not the merely incidental effect of enforcing the police powers of a state." In the *Eubank* case, which had been argued before the first case was decided, it appeared that the state court had construed the same provision of the Kentucky constitution as embracing a long haul from a place outside to one within the state (Nashville and Louisville) and a shorter haul on the same line and in the same direction between points within the state. The court held that, so construed, the provision was invalid as being a regulation of interstate commerce because it linked the interstate rate to the rate for the shorter haul, and thus the interstate charge was directly controlled by the state law. The authority of the former decision upholding the state law, as applied to places all of which were within the state, was in no way impaired, and the court fully recognized the power of the state to prescribe maximum charges for intrastate traffic although carried over an interstate road to points on the state line.

The case of *Minneapolis & St. Louis Railroad Co., vs. Minnesota*, 186 U. S., 257, involved shipments of hard coal in carload lots from Duluth, Minn., to points in the southern and western portion of that state. The Railroad and Warehouse Commission of Minnesota, in 1899, prescribed a joint rate to be observed by the St. Paul & Duluth Railroad Co., the Minneapolis & St. Louis Railroad Co. and other carriers. The state court directed the issue of a writ of mandamus to compel compliance with the order. It was objected that the act under which the order was made was unconstitutional

so far as it assumed to establish joint through rates over the lines of independent connecting railroads and to divide joint earnings, and that the tariff as fixed was not compensatory. This court affirmed the judgment. In *Alabama & Vicksburg Railroad Co. vs. Mississippi Railroad Commission*, 203 U. S., 496, the company made what it called a "rebilling rate" on grain shipped from Vicksburg to Meridian, Miss., which was applicable only in case of shipments received at Vicksburg over the Shreveport line. It gave, however, to such shippers an option for a specified time to send other grain from Vicksburg instead, and thus it was in fact a local rate. To end this discrimination, the state commission, in 1903, fixed the same rate for all grain products shipped from Vicksburg to Meridian. It was urged that the effect of the order would be to force the plaintiff to enter into joint through interstate tariffs and divisions with all lines reaching Vicksburg by rail or river, whether it desired such arrangements or not. The court sustained the order, holding that it was competent for the state to enforce equality as to local transportation, and that this equality could not be defeated "in respect to any local shipments by arrangements made with or to favor outside companies."

In *Northern Pacific Railway Co. vs. North Dakota*, 216 U. S., 579, the attorney-general of North Dakota charged the company with continuous violation of a law fixing rates for the carriage of coal within the state (North Dakota, Laws of 1907, c. 51) and asked for an injunction. It appears by the record that in its return to the rule to show cause in the state court, the company alleged that the statute was void because repugnant to the commerce clause, and also that the rate fixed thereby was confiscatory. In support of the last contention the return set forth that the maximum rates for carrying coal which the company was allowed to charge under the act in question, were greatly lower than the rates for similar service fixed by Minnesota for that state (reference being made to Chapter 232 of the Laws of 1907, the commodity rate act now in question) and those fixed by the Railroad Commissions of Illinois and Iowa, respectively; and that the conditions existing in North Dakota made it impossible to transport coal at a less rate than in the states named. The contention that the act violated the interstate commerce clause was said by the Supreme Court of the state to be based upon the assumption that state regulation of local rates on interstate lines amounted to an interference with interstate commerce.

In view of the decisions of this court, the last question was not considered open to debate. This ruling was not challenged by the argument for the plaintiff in error here, and the question as to interference with interstate commerce was treated as removed from the case by the holding of the state court that the rates applied only to transportation within the state.

AUTHORITY OF CONGRESS SUPREME.

To suppose, however, from a review of these decisions, that the exercise of this acknowledged power of the state may be permitted to create an irreconcilable conflict with the authority of the nation, or that through an equipoise of powers an effective control of interstate commerce is rendered impossible, is to overlook the dominant operation of the Constitution which, creating a Nation, equipped it with an authority, supreme and plenary, to control national commerce and to prevent that control, exercised in the wisdom of Congress, from being obstructed or destroyed by any opposing action. But, as we said at the outset, our system of government is a practical adjustment by which the national authority as conferred by the Constitution is maintained in its full scope without unnecessary loss of local efficiency. It thus clearly appears that, under the established principles governing state action, the state of Minnesota did not transcend the limits of its authority in prescribing the rates here involved, assuming them to be reasonable intrastate rates. It exercised an authority appropriate to its territorial jurisdiction and not opposed to any action thus far taken by Congress.

The interblending of operations in the conduct of interstate and local business by interstate carriers is strongly pressed upon our attention. It is urged that the same right-of-way, terminals, rails, bridges and stations are provided for both classes of traffic; that the proportion of each sort of business varies from year to year and, indeed, from day to day; that no division of the plant, no apportionment of it between interstate and local traffic, can be made today which will hold tomorrow; that terminals, facilities and connections in one state aid the carrier's entire business and are an element of value with respect to the whole property and the business in other states; that securities are issued against the entire line of the carrier and cannot be divided by states; that tariffs should be made with a view to all the traffic of the road and should be fair as between through and short-haul business; and that, in substance, no regulation of rates can be just which does not take into considera-

tion the whole field of the carrier's operations, irrespective of state lines. The force of these contentions is emphasized in these cases, and in others of like nature, by the extreme difficulty and intricacy of the calculations which must be made in the effort to establish a segregation of intrastate business for the purpose of determining the return to which the carrier is properly entitled therefrom.

But these considerations are for the practical judgment of Congress in determining the extent of the regulation necessary under existing conditions of transportation to conserve and promote the interests of interstate commerce. If the situation has become such, by reason of the interblending of the interstate and intrastate operations of interstate carriers, that adequate regulation of their interstate rates cannot be maintained without imposing requirements with respect to their intrastate rates which substantially affect the former, it is for Congress to determine, within the limits of its constitutional authority over interstate commerce and its instruments the measure of the regulation it should supply. It is the function of this court to interpret and apply the law already enacted, but not under the guise of construction to provide a more comprehensive scheme of regulation than Congress has decided upon. Nor, in the absence of Federal action, may we deny effect to the laws of the state enacted within the field which it is entitled to occupy until its authority is limited through the exertion by Congress of its paramount constitutional power.

ARE THE STATE'S ACTS CONFISCATORY?

Second. Are the state's acts and orders confiscatory?

The rate-making power is a legislative power and necessarily implies a range of legislative discretion. We do not sit as a board of revision to substitute our judgment for that of the legislature, or of the commission lawfully constituted by it, as to matters within the province of either. The case falls within a well-defined category. Here we have a general schedule of rates, involving the profitableness of the intrastate operations of the carrier taken as a whole, and the inquiry is whether the state has overstepped the constitutional limit by making the rates so unreasonably low that the carriers are deprived of their property without due process of law and denied the equal protection of the laws.

The property of the railroad corporation has been devoted to a public use. There is always the obligation springing from the na-

ture of the business in which it is engaged—which private exigency may not be permitted to ignore—that there shall not be an exorbitant charge for the service rendered. But the state has not seen fit to undertake the service itself; and the private property embarked in it is not placed at the mercy of legislative caprice. It rests secure under the constitutional protection which extends not merely to the title, but to the right to receive just compensation for the service given to the public.

In determining whether that right has been denied, each case must rest upon its special facts. But the general principles which are applicable in a case of this character have been set forth in the decisions.

(1) The basis of calculation is the “fair value of the property” used for the convenience of the public. *Smyth vs. Ames*. Or as it was put in *San Diego Land & Town Co. vs. National City*. “What the company is entitled to demand, in order that it may have just compensation, is a fair return upon the reasonable value of the property at the time it is being used for the public.”

ASCERTAINMENT OF FAIR VALUE.

(2) The ascertainment of that value is not controlled by artificial rules. It is not a matter of formulas, but there must be a reasonable judgment, having its basis in a proper consideration of all relevant facts. The scope of the inquiry was thus broadly described in *Smyth vs. Ames*. “In order to ascertain that value, the original cost of construction, the amount expended in permanent improvements, the amount and market value of its bonds and stock, the present as compared with the original cost of construction, the probable earning capacity under particular rates prescribed by statute, and the sum required to meet operating expenses, are all matters for consideration, and are to be given such weight as may be just and right in each case. We do not say that there may not be other matters to be regarded in estimating the value of the property. What the company is entitled to ask is a fair return upon the value of that which it employs for the public convenience. On the other hand, what the public is entitled to demand is that no more be exacted from it for the use of a public highway than the services rendered by it are reasonably worth.”

(3) Where the business of the carrier is both interstate and intrastate, the question whether a scheme of maximum rates fixed by

the state for intrastate transportation affords a fair return must be determined by considering separately the value of the property employed in the intrastate business and the compensation allowed in that business under the rates prescribed. This was also ruled in the *Smyth* case. The reason, as there stated, is that the state cannot justify unreasonably low rates for domestic transportation, considered alone, upon the ground that the carrier is earning large profits on its interstate business, and on the other hand, the carrier cannot justify unreasonably high rates on domestic business because only in that way is it able to meet losses on its interstate business.

In the present cases the necessity of this segregation of the domestic business in determining values and results of operation was recognized by both parties. Voluminous testimony was taken before the master, and numerous exhibits containing data and calculations were submitted for the purpose of showing their respective estimates of the value of the entire property of the carriers in Minnesota, the amount of income and expense in that state, their theories of apportionment between the interstate and intrastate business, and their contentions as to the net return for the intrastate transportation under the state rates. The multitude of facts which are involved makes it impossible here to present a comprehensive review, even in a summary way. We must be content with a statement of the salient points and deal only with those matters which, after a careful consideration of the entire record, we regard as controlling our decision.

In each of the three cases (save in certain particulars, which we need not now mention, with respect to that of the Minneapolis & St. Louis Railroad Co.) the method adopted by the master was as follows:

MASTER'S METHOD OF VALUATION.

The period taken for the purpose of testing the sufficiency of the rates was the fiscal year ending June 30, 1908. During this period all the rates in question, freight and passenger, were actually in force, with the exception of the commodity rates prescribed by the act of April 18, 1907, which had been enjoined. The amount of the reduction in the intrastate revenue which would have been caused by the application of the commodity rates is shown.

The master found the present value of the entire property of the carrier, used in the public service in the state of Minnesota. This

valuation was as of June 30, 1908, and was made on the basis of the cost of reproduction new. The master also made findings as to the original cost of construction, and as to the present value on the basis of cost of reproduction new, of the entire system of the carrier. The estimated value of the railroad property within the state was divided between the freight and passenger business upon the relation of the gross revenue derived from each. The part of the total value which was thus assigned to the freight business within the state was then divided between the interstate and intrastate freight business on the basis of gross revenue; and a similar division was made between the interstate and intrastate business of the property value assigned to the passenger department. In this way the master found the value of the property used in intrastate transportation, freight and passenger, upon which he computed the net return received by the carrier.

There was no substantial dispute as to the amount of the entire revenue assignable to the state or as to its division between interstate and intrastate business, as an examination of the transactions in which the revenue was obtained permitted the making of the requisite apportionments with reasonable certainty.

The master also ascertained the total expense incurred by the carrier within the state. This expense was first divided between freight and passenger business. Those items of cost which were directly incurred in each sort of business, and not common to both, were directly assigned; and such items were found to cover about 60 per cent of all expenses. The remaining items, those of common expense, were divided between the freight and passenger business upon the relation, as to most of them, of revenue train-miles, and as to the others, of revenue engine-miles.

Having thus ascertained the share of the expense within the state of the freight and passenger departments, respectively, it remained to divide that share, in each case, between the interstate and intrastate business. This apportionment was made, in the case of freight expense, upon what was termed an "equated ton-mile basis;" and in the case of passenger expense upon an "equated passenger-mile basis." That is to say, the master concluded that the cost per ton-mile of doing the intrastate freight business was at least two and one-half times the cost per ton-mile of the interstate freight business, and hence he divided the total freight expense according to

the relation of the interstate and intrastate ton-miles after the latter had been increased two and one-half times. In the case of the passenger expense, he concluded that the cost per passenger-mile in the intrastate business was at least 15 per cent greater than that in the interstate business, and the total passenger expense was divided upon the relation of passenger-miles after increasing the intrastate passenger-miles 15 per cent. By the use of equalizing factors, the same result was obtained upon what was called an "equated revenue basis."⁴

The net profits of the interstate and intrastate business, respectively, passenger and freight, were then found by deducting the apportioned share of expense from the apportioned share of revenue, and the rate per cent of the net profit upon the property value assigned to each sort of business was computed. The master concluded that the returns from intrastate transportation were unreasonably low and hence that the rates in question were confiscatory.

The validity of the results depends upon the estimates of the value of the property within the state and the apportionments both of value and of expense between interstate and intrastate operations.

It will be convenient to take up the three cases separately:

NORTHERN PACIFIC VALUATION.

1. Northern Pacific Railway Co.

The par value, April 30, 1908, of the stock of this company was found to be \$215,539,634.99, and of the bonds \$190,256,577.66; total, \$405,796,392.65. (Included in this statement of capital stock is the sum of \$60,539,634.99 received to April 30, 1908, upon subscriptions to new capital stock (\$95,000,000) authorized by stockholder's resolution, January 7, 1907.)

These securities and their value in the market rest upon the entire property of the company. They include assets of considerable value (for example, the stock of the Northwestern Improvement Co., owning extensive coal lands), which, however, do not form part of what may be called the operating property of the company, or that devoted to the public service, upon which the fair return is to be calculated (15 I. C. C., 376, 397, 407). Referring to the market value of these securities, the master said: "Asseis and property not devoted to public service have not been valued, and as they are

⁴ See Master's Report, Railway Library for 1910.

a large element in stock valuation it follows that value of bonds and stocks is wholly unreliable and cannot be used in these cases as an element in determining the value of operating property or as a basis for rate-making." In this view the master was undoubtedly right.

Much evidence was produced before the master for the purpose of showing the actual cost of construction and equipment of the entire railroad system from the beginning down to April 30, 1908. This, the master states, could be shown only by the corporate books and records; and in the early history of the original company these are somewhat obscure and uncertain and, by reason of lapse of time, could not be verified by other proof. The total investment cost of the railroad system of the Northern Pacific thus shown was \$369,252,755. This included certain items which the master held not to be properly allowable as a part of the cost, and after their deduction the cost was found to be \$312,243,555. Of this investment cost, it appears from the evidence submitted by the company's controller that the sum of \$128,184,985.82 was expended for construction and equipment, and for improvements and betterments, during the period from September 1, 1896, to April 30, 1908. The master found that the Minnesota track mileage is substantially 21 per cent of the track mileage of the whole system and that if the cost were proportioned accordingly the amount assignable to the state of the entire cost of construction and equipment, as stated, would be \$65,571,462.

The master, however, and the court below in confirming his findings, held that rates were not to be predicated upon the original investment.

Taking, as the basis, the cost of reproduction new, the master found the value of the entire railroad system or operating property of this company to be \$452,666,489.⁵ The value of that portion of the system which was in the state of Minnesota was separately found, on the same basis, to be \$90,204,545. It was upon this estimate of the value of the property in the state, as apportioned

⁵ This estimate did not include the interest of the Northern Pacific in the Spokane, Portland & Seattle Railroad, which was under construction, or the Big Forks & International Falls Railway or the Minnesota & International Railway, or in certain lines in Manitoba under lease which were found not to be part of the operating system.

between the interstate and intrastate business, that the master computed the rate of return^{5½}.

PROFITS OF THE COMPANY.

The total net profits of the company for the fiscal year ending June 30, 1908, from its Minnesota business (interstate and intrastate) was found to be \$5,431,514.56. This was equal to 6.021 per cent on the entire estimated value of the property. This showing of the results of the entire business at once directs attention to the importance of the methods adopted in making apportionments, but before considering these the question is presented as to the soundness of the underlying estimate of value. May it be accepted as a basis for finding that the rates are confiscatory?

Values. The items entering into the valuation are set forth in the margin.⁶

The first item is:

"Lands for right-of-way, yards and terminals, \$21,024,562."

This is for the bare land, without structures or improvements of any sort, as the entire cost of reproduction in building the road and erecting all the existing structures is covered in other items. The master states that the amount thus allowed for the land is made up as follows:

Terminal properties, St. Paul appraisalment of Read, Watson & Taylor, as modified by railroad company.....	\$7,645,100.24
Add 5 per cent for the cost of acquisition and consequential damages	382,255.01
Property acquired after appraisalment.....	328,725.69
Minneapolis appraisalment of Elwood, Barney and Ridgeway, as modified by railway company.....	4,027,616.17
Add 5 per cent for acquisition and consequential damages..	201,380.80
Property acquired after appraisalment.....	227,737.26
Duluth, appraisalment of Stryker, Mendenhall and Little....	3,602,443.43
Add 25 per cent for railway value, cost of acquisition and consequential damages.....	900,610.85
Total value of terminals.....	17,315,869.45
Lands outside of terminals.....	3,708,693.45
Grand total.....	21,024,562.90

The appellants insist that no more than \$9,498,099.27 should have been allowed.

^{5½} In 1908 the Northern Pacific company paid \$573,111 in taxes to the state of Minnesota. Computed on the average tax rate paid on estimated true value according to the United States census (\$.61 per \$100), this was equivalent to paying taxes on a total value of \$93,950,000.—S. T.

⁶ For valuation of the three roads vide *Railway Library* for 1910, pp. 47-48.

METHOD OF VALUATION OPPOSED.

It is contended that the valuation was made upon a wrong theory; that it is a speculative estimate of "cost of reproduction;" that it is largely in excess of the market value of adjacent or similarly situated property; that it does not represent the present value, in any true sense, but constitutes a conjecture as to the amount which the railway company would have to pay to acquire its right-of-way, yards and terminals, on an assumption, itself inadmissible, that, while the railroad did not exist, all other conditions, with respect to the agricultural and industrial development of the state, and the location, population and activities of towns, villages and cities, were as they now are.⁷

We may first consider the basis for the finding with respect to the "lands outside terminals," that is, the right-of-way and station grounds, etc., outside the three cities.

(a) Lands outside terminals. The complainants' witness was Mr. Cooper, the land commissioner of the company, who has charge of the land grants for its entire system, of its right-of-way and land purchases, and has had a wide experience in connection with land values along the lines of the railway. In the latter part of 1906 the state notified the company to report the value of its properties, requiring a statement in one column of the "market value" and in another column of the "value for railway purposes." Mr. Cooper was instructed to prepare the valuation for this report. From the information he received in special inquiries, and his own knowledge, and following what he understood to be the instructions from the state, he set down under the heading of "market value," not the market value in the proper sense of that term, but what in his judgment it would cost the railroad company to acquire the land. This included an excess which he estimated the company would have to pay over the market value of contiguous and similar property if it were called upon to undertake such a reproduction of its right-of-way. It did not, however, embrace an allowance for payments which might have to be made for improvements that possibly might be found upon the property in such case, or for the consequential

⁷ Why "inadmissible," since the conditions exist which would compel any competing railway now projected to acquire right of way upon precisely the terms of construction recognized by the Master? Being in possession does not depreciate the value of railway right of way, but enhances it. As a matter of fact the values of right of way in desirable terminals are so far and away beyond "the market value of contiguous and similar property" as to be practically prohibitive.—S. T.

or severance damages which might possibly have to be met or for the expense of acquisition. These supposed additional outlays he undertook to estimate. For this purpose he increased the "market value" as stated (in the case of agricultural lands generally multiplying it by three) and thus reached the amount set down as the "value for railway purposes." As it serves clearly to illustrate the theory upon which the land valuations were made, we make the following excerpts from Mr. Cooper's testimony:

DEFINITION OF VALUE.

"The Master: When you speak of value, you mean cost of purchase?

"Witness: Cost of purchase; we are using the word 'value' somewhat wrongly, as we are talking along here. It is the cost of purchasing that property today.

"Witness: The word 'value' doesn't seem to me to fit this case, because all the time we are figuring on the cost of reproducing this property, and our instructions from the state use the word 'reproduce.' Now, if a railroad company could buy property at what is generally considered its value, the word 'value' would fit in all right, but there is this excess which a railroad company has to pay beyond what is generally accepted as its value which increases the cost of reproducing a railroad property.

"Q. And this excess which you now speak of is included in your market values as reported to the state and used in your testimony?

A. That is right. . . .

"Q. . . . Well, now, does the term 'market value' as you have used it in making this report to the state and in your testimony here, have the same meaning, or is it used in the same sense with reference to the values you have fixed and reported to the state for properties on the right-of-way outside of the terminals and outside of the larger cities? A. Oh, yes.

"Q. As in the cities here? A. Yes; the same rule was applied all through in the Minnesota valuations.

"Q. Therefore, your judgment as to the value of the railroad property is always that it is higher than the value of contiguous property? A. Yes, yes, that is true. . . .

"Q. So that, in every case, what you call the market value is the value of contiguous or similarly situated property, with an additional amount which a railroad company is ordinarily compelled to pay? A. That is right. . . .

"Q. You have put into the market value the excess which a railroad company pays for land? A. That is correct.

"Q. Then, when you multiply that by three, you are multiplying by three one of the elements going to make up excessive cost to a railroad company? A. That is right. . . .

"Q. And you are unable to state how much upon the average you have added to the true or normal market value, to allow for the additional amount which the railroad company would have to pay upon the hypothesis that it is now compelled to purchase the land? A. That is correct.

"Q. And then having determined to your satisfaction at what figure or sum you would place the market value of this property to the railroad company, as you have described, you have added another sum for severance damage, cost of improvements unnecessary to the company, easements in abutting property and general expenses? A. That is correct.

"Q. And you have determined that, in agricultural communities this second addition is shown by the use of the multiple 3? A. I think the multiple of 3 is too low, and I so testified in this case. When you are going through a highly cultivated country, I think the multiplier of 3 is not enough.

"Q. But that is what you used for the purpose of the right-of-way value of land through the agricultural communities? A. That is right, in this state.

"Q. And in the cities, in the three large terminals, you have added to what you describe as the market value of lands to the railroad company, ascertained as described by you already, the amount necessary to produce the difference shown in your testimony between the market value of the terminals and the right-of-way value? A. That is right.

"Q. And while you are able to show, and we can ascertain from an inspection of your testimony, the amount of the difference between the market value to the railroad company, as you have described, and the right-of-way value, and, in the rural communities or agricultural districts, the difference between the market value

to you and the right-of-way value, there is nothing in any of your exhibits which will show, nor are you now prepared to state, the difference in what might be termed the normal, true, ordinary market value of the lands to the ordinary individual, and the sum which you have fixed as the market value to the railroad company if it were now compelled to purchase? A. That is correct."

The "market value" of the lands (outside of the three cities) thus fixed and reported to the state was \$2,008,491.50, and the increased amount estimated, in the manner stated, which was reported as the "value for railway purposes," was \$4,944,924.60. The latter amount was submitted by the complainants in this case as the value of the lands. The master thought that the complainants' witness used too large a multiplier and allowed 75 per cent of the amount thus claimed, or \$3,708,693.45, stating that this was determined upon as the "fair reproduction value of the property." This allowance, it will be observed, was about \$1,700,000 in excess of Mr. Cooper's estimate of "market value," as that term was used in making the report.

TERMINAL PROPERTIES.

(b) Terminal properties. This term is used to designate the lands for the right-of-way, yards and terminals in St. Paul, Minneapolis and Duluth. The total original cost of these lands to the company (according to its statement based on the best information obtainable), including purchases to April 30, 1908, was \$4,527,228.76. The master allowed as their value, apart from the improvements made by the company which, as we have said, were embraced in the other items of reproduction cost, the sum of \$17,315,869.45.*

In preparing the valuation for the report to the state, Mr. Cooper employed real estate men in each of the cities to make an appraisal. He instructed them, as he testifies, "to make a conservative report of the cost of reproducing the properties owned by the company in each of their respective cities." They divided the property into districts and reported their estimate of units of value, as, for

* The acquisition of these terminal properties covered 51 years prior to 1908, the essential terminals having been acquired prior to 1875. As money invested at 6 per cent doubles in less than 12 years, five millions invested 36 years ago, say in 1877, would have increased to over forty millions by this time. The wealth of Minnesota, according to the census experts, has increased from \$183,127,672 in 1870 to \$3,343,722,026 in 1904, or over 18-fold. Values in St. Paul, Minneapolis and Duluth have increased even more rapidly. In view of these facts, the estimate of the Master of the reproduction value of terminal properties seems to lean to the conservative side.—S. T.

example, by the square foot. Mr. Cooper took these reports, discussed their valuations with the appraisers, and, aided by his own knowledge, formed an independent judgment, in no case increasing and in some instances (with respect to certain St. Paul and Minneapolis property) reducing the appraisers' values. He then set forth under the heading "market value" in the report to the state, as described in the testimony we have quoted, his estimate of what it would cost the company to purchase these lands, exclusive of improvements that might be upon them, severance and consequential damages and expenses incident to acquisition. The amounts he thus fixed were as follows: For the property in St. Paul, \$7,645,100.24; in Minneapolis, \$4,027,616.17; in Duluth, \$3,555,593.93. In the case of the St. Paul and Minneapolis properties the amounts are precisely those adopted by the master in his findings, and to this he adds 5 per cent to cover cost of acquisition and consequential damages. The master was of the opinion that the appraisers of these properties were "fully impressed with their value for railroad purposes" and that their appraisal as verified by them before him and modified by the railway company "is a generous valuation and should be accepted as full railroad value of the terminal properties," and it was so accepted with the addition above stated. With respect to the Duluth property, where the appraisal appears to have rested upon the ordinary values of real estate, the master sets forth as the appraised value \$3,602,443.43, to which he adds 25 per cent, or \$900,610.85, "for railway value, cost of acquisition and consequential damages."

In reviewing the findings, the court below reached the conclusion that "the master in effect found that the cost of reproduction and the present value of the lands for the terminals in the three great cities, including therein all cost of acquisition, consequential damages and value for railroad use which he allowed was only about 30 per cent more than the normal value of the lands in sales between private parties. He found the value of the lands outside the terminals to be only twice their normal value."

From our examination of the evidence we are unable to conclude that the excess stated may be thus limited. What is termed the normal value does not satisfactorily appear. It further will be observed—from the summary of valuations we have set forth in the margin ^o—that the amount thus allowed in Item 1 for lands, yards

^o See page 122.

and terminals, both in and out of the three cities (\$21,024,562), was included in the total on which 4½ per cent was allowed in Item 30 for "Engineering, superintendence, legal expenses," and again was included in the total on which 5 per cent was allowed in Item 37 for "Contingencies," and, in addition, was included in the total on which 10 per cent was allowed in Item 39 for "Interest during construction."

COST OF REPRODUCTION METHOD.

These are the results of the endeavor to apply the cost-of-reproduction method in determining the value of the right-of-way. It is at once apparent that, so far as the estimate rests upon a supposed compulsory feature of the acquisition, it cannot be sustained. It is said that the company would be compelled to pay more than what is the normal market value of property in transactions between private parties; that it would lack the freedom they enjoy, and, in view of its needs, it would have to give a higher price. It is also said that this price would be in excess of the present market value of contiguous or similarly situated property. It might well be asked, who shall describe the conditions that would exist, or the exigencies of the hypothetical owners of the property, on the assumption that the railroad were removed? But, aside from this, it is impossible to assume, in making a judicial finding of what it would cost to acquire the property that the company would be compelled to pay more than its fair market value. It is equipped with the governmental power of eminent domain.¹⁰ In view of its public purpose, it has been granted this privilege in order to prevent advantage being taken of its necessities. It would be free to stand upon its legal rights, and it cannot be supposed that they would be disregarded.

It is urged that, in this view, the company would be bound to pay the "railway value" of the property. But supposing the railroad to be obliterated and the lands to be held by others, the owner of each parcel would be entitled to receive on its condemnation, its fair market value for all its available uses and purposes. If, in the case of any such owner, his property had a peculiar value or special adaptation for railroad purposes, that would be an element to be considered. But still the inquiry would be as to the fair market value of the property; as to what the owner had lost, and not what the taker had gained. The owner would not be entitled to demand

¹⁰ That in railway experience is the power to acquire property at from one and a half to three times its market value.—S. T.

payment of the amount which the property might be deemed worth to the company; or of an enhanced value by virtue of the purpose for which it was taken; or of an increase over its fair market value, by reason of any added value supposed to result from its combination with tracks acquired from others so as to make it a part of a continuous railroad right-of-way held in one ownership. There is no evidence before us from which the amount which would properly be allowable in such condemnation proceedings can be ascertained.

ESTIMATE OF COST IS SPECULATION.

Moreover, it is manifest that an attempt to estimate what would be the actual cost of acquiring the right-of-way, if the railroad were not there, is to indulge in mere speculation. The railroad has long been established; to it have been linked the activities of agriculture, industry and trade. Communities have long been dependent upon its service, and their growth and development have been conditioned upon the facilities it has provided. The uses of property in the communities which it serves are to a large degree determined by it. The values of property along its line largely depend upon its existence. It is an integral part of the communal life. The assumption of its non-existence, and at the same time that the values that rest upon it remain unchanged, is impossible and cannot be entertained. The conditions of ownership of the property and the amounts which would have to be paid in acquiring the right-of-way, supposing the railroad to be removed, are wholly beyond reach by any process of rational determination.¹¹ The cost-of-reproduction method is of service in ascertaining the present value of the plant, when it is reasonably applied and when the cost of reproducing the property may be ascertained with a proper degree of certainty. But it does not justify the acceptance of results which depend upon mere conjecture. It is fundamental that the judicial power to declare legislative action invalid upon constitutional grounds is to be exercised only in clear cases. The constitutional invalidity must be manifest, and if it rests upon disputed questions of fact, the invalidating facts must be proved. And this is true of asserted value as of other facts.

The evidence in these cases demonstrates that the appraisements of the St. Paul and Minneapolis properties which were accepted

¹¹ Is the acquirement of right of way for new and competing terminals inconceivable and impossible even if the present value of city terminals without railways is?—S. T.

by the master were in substance appraisals of what was considered to be the peculiar value of the railroad right-of-way. Efforts to express the results in the terms of a theory of cost of reproduction fail, as naturally they must, to alter or obscure the essential character of the work undertaken and performed. Presented with an impossible hypothesis, and endeavoring to conform to it, the appraisers—men of ability and experience—were manifestly seeking to give their best judgment as to what the railroad right-of-way was worth. And doubtless it was believed that it might cost even more to acquire the property, if one attempted to buy into the cities as they now exist and all the difficulties that might be imagined as incident to such a “reproduction” were considered. The railroad right-of-way was conceived to be a property *sui generis*, “a large body of land in a continuous ownership,” representing one of the “highest uses” of property and possessing an exceptional value. The estimates before us, as approved by the master, with his increase of 25 per cent in the case of the Duluth property, must be taken to be estimates of the “railway value” of the land; and whether or not this is conceived of as paid to other owners upon a hypothetical reacquisition of the property is not controlling when we come to the substantial question to be decided.

THE SUBSTANTIAL QUESTION.

That question is whether, in determining the fair present value of the property of the railroad company as a basis of its charges to the public, it is entitled to a valuation of its right-of-way not only in excess of the amount invested in it, but also in excess of the market value of contiguous and similarly situated property. For the purpose of making rates, is its land devoted to the public use to be treated (irrespective of improvements) not only as increasing in value by reason of the activities and general prosperity of the community, but as constantly outstripping in this increase, all neighboring lands of like character, devoted to other uses? If rates laid by competent authority, state or national, are otherwise just and reasonable, are they to be held to be unconstitutional and void because they do not permit a return upon an increment so calculated?

It is clear that in ascertaining the present value we are not limited to the consideration of the amount of the actual investment. If that has been reckless or improvident, losses may be sustained which the community does not underwrite. As the company may not be protected in its actual investment, if the value of its property be plainly

less, so the making of a just return for the use of the property involves the recognition of its fair value if it be more than its cost. The property is held in private ownership and it is that property, and not the original cost of it, of which the owner may not be deprived without due process of law. But still it is property employed in a public calling, subject to governmental regulation and while under the guise of such regulation it may not be confiscated, it is equally true that there is attached to its use the condition that charges to the public shall not be unreasonable. And where the inquiry is as to the fair value of the property, in order to determine the reasonableness of the return allowed by the rate-making power, it is not admissible to attribute to the property owned by the carriers a speculative increment of value, over the amount invested in it and beyond the value of similar property owned by others, solely by reason of the fact that it is used in the public service. That would be to disregard the essential conditions of the public use, and to make the public use destructive of the public right.

The increase sought for "railway value" in these cases is an increment over all outlays of the carrier and over the values of similar land in the vicinity. It is an increment which cannot be referred to any known criterion, but must rest on a mere expression of judgment which finds no proper test or standard in the transactions of the business world.¹² It is an increment which in the last analysis must rest on an estimate of the value of the railroad use as compared with other business uses; it involves an appreciation of the returns from rates (when rates themselves are in dispute) and a sweeping generalization embracing substantially all the activities of the community. For an allowance of this character there is no warrant.

INCREASE IN VALUE LIMITED.

Assuming that the company is entitled to a reasonable share in the general prosperity of the communities which it serves, and thus to attribute to its property an increase in value, still the increase so allowed, apart from any improvements it may make, cannot properly extend beyond the fair average of the normal market value of land in the vicinity having a similar character. Otherwise we enter the

¹² And yet it is present every day that a railway seeks to acquire an additional foot or square mile for "public use."—S. T.

realm of mere conjecture.¹³ We therefore hold that it was error to base the estimates of value of the right-of-way, yards and terminals upon the so-called "railway value" of the property. The company would certainly have no ground of complaint if it were allowed a value for these lands equal to the fair average market value of similar land in the vicinity, without additions by the use of multipliers, or otherwise, to cover hypothetical outlays. The allowances made below for a conjectural cost of acquisition and consequential damages must be disapproved; and, in this view, we also think it was error to add to the amount taken as the present value of the lands the further sums, calculated on that value, which were embraced in the items of "engineering, superintendence, legal expenses," "contingencies" and "interest during construction."

By reason of the nature of the estimates, and the points to which the testimony was addressed, the amount of the fair value of the company's land cannot be satisfactorily determined from the evidence, but it sufficiently appears for the reasons we have stated that the amounts found were largely excessive.

Finding this defect in the proof, it is not necessary to consider the objections which relate to the sources from which the property was derived or its mode of acquisition, or those which are urged to the inclusion of certain lands which it is said were not actually used as a part of the plant; and we express no opinion upon the merits of these contentions.

The property other than land, as the detailed statement shows, embraced all items of construction, including roadbed, bridges, tunnels, etc., structures of every sort, and all appliances and equipment. The cost of reproduction new was ascertained by reference to the prices for such work and property. In view of the range

¹³ But every time a railroad attempts to purchase land for "public use" it has to enter this realm of conjecture, from which it emerges by the condemnation route or otherwise on paying from one and a half to three times the fair market value for more land than it wants. Let us imagine that, inspired by a mistaken policy toward existing private railways, the government of the United States were to attempt to parallel the New York Central lines from New York Times Square, to Van Buren and Clark streets, Chicago. Can there be any doubt that it would have to pay a "railway value" for the property acquired by negotiation or condemnation, not only for its terminals in New York but through all the cities, towns, hamlets and farms for over 900 miles? It is within reason to estimate that one mile alone of right of way to the heart of New York would cost between \$50,000,000 and \$100,000,000. In the opinion of the Railroad Commission of Wisconsin, of which Commissioner Meyer of the Interstate Commerce Commission was a member, in the Buel case, the cost of railways includes "the value of the right of way, yards and terminals at two and one-half times the prices of adjacent real estate."—S. T.

of the questions we have been called upon to consider, we shall not extend this opinion for the purpose of reviewing this estimate, or of passing upon exceptions to various items in it, as their disposition would not affect the result.

MASTER MADE NO ALLOWANCE FOR DEPRECIATION.

The master allowed the cost of reproduction new without deduction for depreciation. It was not denied that there was depreciation in fact. As the master said, "everything on and above the roadbed depreciates from wear and weather stress. The life of a tie is from eight to ten years only. Structures become antiquated, inadequate and more or less dilapidated. Ballast requires renewal, tools and machinery wear out, cars, locomotives and equipment, as time goes on, are worn out or disregarded for newer types." But it was found that this depreciation was more than offset by appreciation; that "the roadbed was constantly increasing in value;" that it "becomes solidified, embankments and slopes or excavations become settled and stable and so the better resist the effects of rains and frost;" that it "becomes adjusted to surface drainage, and the adjustment is made permanent by concrete structures and rip-rap;" and that in other ways, a roadbed long in use "is far more valuable than one newly constructed." It was said that "a large part of the depreciation is taken care of by constant repairs, renewals, additions and replacements, a sufficient sum being annually set aside and devoted to this purpose, so that this, with the application of roadbed and adaptation to the needs of the country and of the public served, together with working capital . . . fully offsets all depreciation and renders the physical properties of the road not less valuable than their cost of reproduction new." And in a further statement upon the point, the "knowledge derived from experience" and "readiness to serve" were mentioned as additional offsets.

We cannot approve this disposition of the matter of depreciation. It appears that the master allowed, in the cost of reproduction, the sum of \$1,613,612 for adaptation and solidification of roadbed, this being included in the item of grading and being the estimate of the engineer of the state commission of the proper amount to be allowed. It is also to be noted that the depreciation in question is not that which has been overcome by repairs and replacements, but is the actual existing depreciation in the plant as compared with the new one. It would seem to be inevitable that in many parts of the plant there should be such depreciation, as, for example, in old

structures and equipment remaining on hand. And when an estimate of value is made on the basis of reproduction new, the extent of existing depreciation should be shown and deducted. This apparently was done in the statement submitted by this company to the Interstate Commerce Commission in the Spokane rate case in connection with an estimate of the cost of reproduction of the entire system as of March, 1907. In the present case, it appears that the engineer of the state commission estimated the depreciation in the property at between eight and nine million dollars. If there are items entering into the estimate of cost which should be credited with appreciation, this also should appear, so that instead of a broad comparison there should be specific findings showing the items which enter into the account of physical valuation on both sides.

It must be remembered that we are concerned with a charge of confiscation of property by the denial of a fair return for its use; and to determine the truth of the charge there is sought to be ascertained the present value of the property. The realization of the benefits of property must always depend in large degree on the ability and sagacity of those who employ it, but the appraisement is of an instrument of public service, as property, not of the skill of the users. And when particular physical items are estimated as worth so much new, if in fact they be depreciated, this amount should be found and allowed for. If this is not done, the physical valuation is manifestly incomplete. And it must be regarded as incomplete in this case.

APPORTIONMENT OF VALUES.

As the rate of net return from the entire Minnesota business (interstate and intrastate) during the test year was 6.021 per cent on a valuation of \$90,204,545, and would be greater if computed upon a less value, we are brought to the question whether the methods of apportionment adopted are so clearly appropriate and accurate as to require a finding of confiscation of property used in the intrastate business.

The apportionment of the value of the property, as found, between the interstate and intrastate business was made upon the basis of the gross revenue derived from each. This is a simple method, easily applied, and for that reason has been repeatedly used. It has not, however, been approved by this court and its correctness is now challenged. Doubtless, there may be cases where the facts would show confiscation so convincingly in any event, after full allow-

ance for possible errors in computation, as to make negligible questions arising from the use of particular methods.' But this case is not of that character.

In support of this method, it is said that a division of the value of the property according to gross earnings is a division according to the "value of the use," and therefore proper. But it would seem to be clear that the value of the use is not shown by gross earnings. The gross earnings may be consumed by expenses, leaving little or no profit. If, for example, the intrastate rates were so far reduced as to leave no net profits, and the only profitable business was the interstate business, it certainly could not be said that the value of the use was measured by the gross revenue.

It is not asserted that the relation of expense to revenue is the same in both businesses; on the contrary, it is insisted that it is widely different. The master found that the revenue per ton-mile in the intrastate business, as compared with the revenue per ton-mile in the interstate business, was as 1.4387 to 1.0000. And, on his assumption as to the extra cost of doing the intrastate business, he reached the conclusion that the cost per ton-mile in proportion to the revenue per ton-mile in the intrastate business, as compared with the interstate business, was as 1.7377 to 1.0000. It is contended, according to the computations, that only a little over 10 per cent of the entire net revenue of the test year (\$5,431,514.66) was made in the intrastate business, and that 90 per cent thereof was made in the interstate business; but approximately 21 per cent of the total value of the property was assigned to the intrastate business.

GROSS EARNINGS METHOD NOT ACCURATE.

If the property is to be divided according to the value of the use, it is plain that the gross-earnings method is not an accurate measure of that value.

In *Chicago, Milwaukee, etc., Ry. Co. vs. Tompkins*, 176 U. S. 167, the court below had found the value of the plaintiffs' property in South Dakota to be \$10,000,000, and had divided it between the interstate and intrastate business according to the gross receipts from each. Mr. Justice Brewer, in delivering the opinion of the court, after referring to the result reached, said:

"Such a result indicates that there is something wrong in the process by which the conclusion is reached. That there was can be made apparent by further computations, and in them we will take

even numbers as more easy of comprehension. Suppose the total value of the property in South Dakota was \$10,000,000, and the total receipts both from interstate and local business were \$1,000,000, one-half from each. Then, according to the method pursued by the trial court, the value of the property used in earning local receipts would be \$5,000,000, and the per cent of receipts to value would be 10 per cent. The interstate receipts being unchanged, let the local receipts by a proposed schedule be reduced to one-fifth of what they had been, so that instead of receiving \$500,000, the company only receives \$100,000. The total receipts for interstate and local business being then \$600,000, the valuation of \$10,000,000, divided between the two, would give to the property engaged in earning interstate receipts, in round numbers, \$8,333,000, and to that engaged in earning local receipts, \$1,667,000. But if \$1,667,000 worth of property earns \$100,000, it earns 6 per cent. In other words, although the actual receipts from local business are only one-fifth of what they were, the earning capacity is three-fifths of what it was. And, turning to the other side of the problem, it appears that if the value of the property engaged in interstate business is to be taken as \$8,333,000, and it earned \$500,000, its earning capacity was the same as that employed in local business—6 per cent. So that although the rates for interstate business be undisturbed, the process by which the trial court reached its conclusion discloses the same reduction in the earning capacity of the property employed in interstate business as in that employed in local business, in which the rates are reduced." (Id. pp. 176-177.)

The value of the use, as measured by return, cannot be made the criterion when the return itself is in question. If the return, as formerly allowed, be taken as the basis, then the validity of the state's reduction would have to be tested by the very rates which the state denounced as exorbitant. And, if the return as permitted under the new rates be taken, then the state's action itself reduces the amount of value upon which the fairness of the return is to be computed.

When rates are in controversy, it would seem to be necessary to find a basis for a division of the total value of the property independently of revenue, and this must be found in the use that is made of the property. That is, there should be assigned to each business, that proportion of the total value of the property which will correspond to the extent of its employment in that business. It is said

that this is extremely difficult; in particular, because of the necessity for making a division between the passenger and freight business and the obvious lack of correspondence between ton-miles and passenger-miles. It does not appear, however, that these are the only units available for such a division; and it would seem that, after assigning to the passenger and freight departments respectively, the property exclusively used in each, comparable use-units might be found which would afford the basis for a reasonable division with respect to property used in common.¹⁴ It is suggested that other methods of calculation would be equally unfavorable to the state rates, but this we cannot assume.

It is sufficient to say that the method here adopted is not of a character to justify the court in basing upon it a finding that the rates are confiscatory.

APPORTIONMENT OF EXPENSES.

As already stated, it was held in dividing the freight operating expenses, that the cost of doing the intrastate freight business was two and one-half times that of doing the interstate freight business. That is to say, the division of expenses was made according to ton-miles, interstate and intrastate, after the intrastate ton-miles had been increased two and one-half times.

The substantial question is whether the proof established this extra cost with that degree of certainty which is requisite to support a decree invalidating the state rates.

It appeared that the cost of intrastate business was not kept separately or set up in the accounts or statistics of the company.

The president of the company testified as to his judgment in the matter, which was based, in the absence of such accounts, upon the general facts of operation. His testimony was supported by that of other eminent railroad men, who testified in the Great Northern and Minneapolis & St. Louis cases. The elements entering into the greater expense of doing intrastate business were defined to be: That the average haul was shorter, being (in the case of the Northern Pacific) 104.52 miles for intrastate transportation as against 485.3 miles for interstate transportation; that the state business had to be handled twice at terminals; that the local short-haul business used most valuable terminal facilities in order to obtain its proper handling from the larger distributing centers, and used those fa-

¹⁴ Long and diligent experience has failed to discover a satisfactory universal ratio of division.—S. T.

cilities to a greater extent for the tons handled than did the longer through business; that the amount of clerical and warehouse labor in connection with the local business was much greater than in the case of the long-haul through business; that the chances of damage were greater in the short-haul business because of the greater number of individual transactions; that in the short-haul business there was an excess of equipment for loading and unloading; that local or way-freight trains were "loaded lighter," that the wear and tear on the local trains was greater because of frequent stopping and starting; that there was increased switching resulting in greater damage to equipment and tracks; that the local train was generally on the road more hours than a through train and therefore consumed more coal; that in the smaller stations the amount of shifting was large; that many of the local trains carried passengers, involving two stops at each station, one for passengers and the other for the local freight work; that the manner of operation of local trains increased the chances of injury to employes; that the short-haul business moved irregularly and spasmodically and that its facilities were worked at their full capacity only for limited periods.

LONG AND SHORT HAUL BUSINESS. .

From these considerations, which were elaborated in the testimony, the witness reached the conclusion that the "so-called local short-haul intrastate business costs anywhere from three to six or seven times as much as the so-called long-haul through interstate business." In the Great Northern case, the witnesses expressed the opinion that the extra cost of intrastate freight was three or four times greater than that of the interstate freight. One witness said that it would be from four to six times. These estimates, it is understood, had relation to the cost per ton mile.

The appellants do not dispute that business carried for short distances on local trains is more expensive than the handling of other business, but it is insisted that this is due solely to the different train service that it receives. It is said that all through trains start from divisional points and run from one end of the division to the other without stop; that the local trains are made up of cars carrying business destined for points intermediate the termini of the division and take up all traffic originating at the intermediate stations; that the word "local" as applied to these trains is not synonymous with intrastate, but that the local trains

carry a large part of the interstate traffic both in receiving and distributing it; and that by far the greater part of the extra cost of the local train service is properly chargeable to interstate business. It is also insisted that so far as this extra expense can be charged to intrastate business, it is adequately met by the additional revenue of that business, which per ton mile, as compared with the interstate business, is as 1.4387 to 1.0000.

To establish these propositions, and to meet the testimony of the complainants' witnesses, the appellants introduced an elaborate series of calculations, made by a professional accountant, which were deduced from the results of an extended examination of the records of the companies. The witness made computations as to the character of the freight on each road, dividing it between through and local freight upon each operating division, and then sub-dividing it between intrastate and interstate freight. It is contended by the appellants that these calculations are sufficient to show that in the case of the Northern Pacific, about 91 per cent of the freight on through trains was interstate and about 9 per cent intrastate, and that on the local trains the interstate freight amounted to 68.67 per cent and the intrastate, 31.33 per cent. Calculations of this witness were also introduced showing his division of the total expenses between the passenger and freight business, and then in each department between the interstate and intrastate business; and by means of these, it was estimated that, under the rates in question (assuming them to have been applied to the business of the fiscal year ending June 30, 1907, to which the calculations were directed), the net profits on the intrastate business as a whole would have been slightly more than six per cent upon an amount equal to the share of property value attributed to that business by the master's estimate and apportionment of total value.

These computations are assailed by the appellees as inaccurate and as based upon erroneous estimates. We shall not go into the details, and, for the present purpose, we may assume that the appellees are right in their criticism.

EXTRA COST OF INTRASTATE BUSINESS.

Our conclusions may be briefly stated. The statements of the complainants' witnesses as to the extra cost of intrastate business, while entitled to respect as expressions of opinion, manifestly involve wide and difficult generalizations. They embrace, without

the aid of statistical information derived from appropriate tests and submitted to careful analysis, a general estimate of all the conditions of transportation and an effort to express in the terms of a definite relation, or ratio, what clearly could be accurately arrived at only by prolonged and minute investigation of particular facts with respect to the actual traffic as it was being carried over the line. The extra cost, as estimated by these witnesses, is predicated not simply of haulage charges, but of all the outlays of the freight service including the share of the expenses for maintenance of way and equipment assigned to the freight department. And the ratio, to be accurately stated, must also express the results of a suitable discrimination between the interstate and intrastate traffic on through and local trains respectively and of an attribution of the proper share of the extra cost of local train service to the interstate traffic that uses it. The wide range of the estimates of extra cost, from three to six or seven times that of the interstate business per ton mile, shows both the difficulty and the lack of certainty in passing judgment.

We are of the opinion that on an issue of this character involving the constitutional validity of state action, general estimates of the sort here submitted, with respect to a subject so intricate and important, should not be accepted as adequate proof to sustain a finding of confiscation. While accounts have not been kept so as to show the relative cost of interstate and intrastate business, giving particulars of the traffic handled on through and local trains, and presenting data from which such extra cost as there may be of intrastate business may be suitably determined, it would appear to have been not impracticable to have had such accounts kept or statistics prepared, at least during test periods properly selected. It may be said that this would have been a very difficult matter, but the company having assailed the constitutionality of the state acts and orders was bound to establish its case, and it was not entitled to rest on expressions of judgment when it had it in its power to present accurate data which would permit the court to draw the right conclusion.

We need not separately review the findings with respect to the division of passenger expenses, as the same considerations are involved, with the distinction, however, that the extra cost attributed to the intrastate business is relatively small as compared with that charged to intrastate freight. And, in view of the conclusions

reached on the controlling questions we have considered, we express no opinion with respect to the method adopted in dividing expenses between the passenger and freight departments.

For the purpose of determining whether the rates permit a fair return, the results of the entire intrastate business must be taken into account. During the test year the entire revenue, as found, from the intrastate business, passenger and freight, amounted to \$2,897,912.26. All the rates in question were in force save the commodity rates and it is further found that the loss that would have accrued in intrastate commodity business, by the application of the commodity rates which were under injunction, would have amounted to \$21,493.67.

As neither the share of the expenses properly attributable to the intrastate business, nor the value of the property employed in it, was satisfactorily shown, and hence it did not appear upon the facts proved that a fair return had been denied to the company, we are of the opinion that the complainant failed to sustain his bill.

GREAT NORTHERN VALUES.

(2) Great Northern Railway Company. The master found that at the time this suit was brought the par value of the stock of the company was \$149,577,500, and of bonds, \$83,119,939; total, \$232,697,439. On June 30, 1908, the par value of the stock was \$209,962,750, and of bonds \$97,955,939.39; total, \$307,918,689.30. The property upon which these securities and their value in the market are based includes, it is found, a very considerable amount not devoted to the public service.

The balance sheet of the company of June 30, 1908, showed the book valuation of the entire system, employed in the public service, to amount to \$319,681,815. The master held that various items were included which were not properly allowable as a part of the cost, and deducting these, there remained as the book-showing of the total amount expended in construction and equipment, \$295,401,213. The Minnesota track mileage was found to be practically 32.59 per cent of the total mileage, and upon this basis, the amount assignable to the state of the total cost, as stated, amounted to \$96,271,255.

COST OF REPRODUCTION.

The master found that the cost of reproduction new of the entire system was \$457,121,469.¹⁵ The value of the portion of the system in Minnesota was separately found, on the basis of reproduction new, to be \$138,425,291. The net profits of the company during the test year from its Minnesota business, interstate and intrastate, were \$8,180,025.11, equal to 5.909 per cent upon this estimated value.

The items entering into the estimate are the same in character as those set forth in the estimate of the value of the property of the Northern Pacific Company.¹⁶

Included in this reproduction cost was an allowance, for "lands for right-of-way, yards and terminals," of \$25,172,650.80, as follows:

St. Paul appraisalment of Read, Watson and Taylor.....	\$ 6,433,348.00
Add 5 per cent for cost of acquisition and consequential damages	321,667.40
Minneapolis, appraisalment of Elwood, Barney and Ridgeway...	11,619,765.00
Add 5 per cent for cost of acquisition and consequential damages	580,968.15
Duluth, appraisalment of Stryker, Mendenhall and Little.....	713,280.00
Add 25 per cent for railroad value, cost of acquisition and consequential damages	178,320.00
Total value of terminals.....	19,847,366.55
Lands outside of terminals.....	5,325,284.25
Grand total.....	\$25,172,650.80

The appraisements thus referred to, adopted by the master with the additions stated, were made by the appraisers in the three cities who were employed in the case of the Northern Pacific Company. The valuations were made at the same time, and upon the same basis, as the corresponding valuations in that case and are open to the same objections. In the company's estimate of the value of the lands outside these cities, the amount stated as the market value was largely increased to obtain the "right-of-way value;" with respect to lands in agricultural sections, the "market value" was generally multiplied by three; and of the total amount of the estimate of the company the master allowed 75 per cent as in the Northern Pacific case.

¹⁵ This did not include the interest of the company in the Spokane, Portland & Seattle R. R., or lines under construction.

¹⁶ See pp. 47-48 *Railway Library* for 1910.

In addition, $4\frac{1}{2}$ per cent of the aggregate land values, as found, was allowed in the item for "engineering, superintendence, legal expenses," and the further allowance of 16 per cent of these land values was made in the item of "interest during construction" (4 per cent for four years).

In the physical valuation estimated on the basis of the cost of reproduction new, the master made no deduction for depreciation, while, on the other hand, there was included under the item of grading the sum of \$3,219,642 for adaptation and solidification of roadbed. The engineer of the state commission estimated the depreciation in the property at approximately \$13,000,000.

What has already been said in the case of the Northern Pacific Company with respect to estimates of value, the apportionment of value, the testimony as to the extra cost of doing the intrastate business and the division of expenses between interstate and intrastate business, is equally applicable here. In these respects there is no material distinction between the two cases and the same conclusion must be reached in both.

MINNEAPOLIS & ST. LOUIS.

(3) Minneapolis & St. Louis Ry. Co. This case presents distinct considerations. The lines of this company consist of about 1,028 miles of track of which 396 miles are operated under lease or trackage rights. Of its owned mileage (632 miles) approximately 60 per cent is in the state of Minnesota. The master thus describes it: "It runs south from the inland cities of St. Paul and Minneapolis to Des Moines, with a branch to Storm Lake, Ia., and a branch to the South Dakota grain fields. Along its entire line it comes in sharp competition with strong intersecting railroad lines, and, while as before stated, it subserves a useful public purpose and is operated in response to public demand, it can be maintained only by the exercise of the highest economy and watchfulness in its operation and to succeed must be given greater latitude than is necessary with respect to the more favorably located and prosperous lines of railway."

The less favorable situation of the road is fully recognized by the appellants, who object to its being regarded as affording a fair test of the sufficiency of the rates. They say that its "total mileage and the geographical location" are such "that it cannot be taken as typical of the railway situation in Minnesota;" and they insist that

"the important and material questions are raised by the showing made in the Northern Pacific and Great Northern cases." And the appellees, on their part, assert that "it cannot be seriously contended that the rates complained of are sufficient to yield any reasonable return on a proportionate value of the property used in the conduct of the business covered by the rates;" that the net income of the road "from all sources is scarcely sufficient to pay interest on its outstanding bonds;" that "the value of the property is greatly in excess of the par value of the bonds;" and that, as it seems to the appellees, "this company must earn more money or go into the hands of a receiver, within a comparatively short time."

The main facts are: The par value in 1908, of this stock and bonds was \$30,011,800, divided as follows: stock, \$10,000,000 (preferred, \$4,000,000; common, \$6,000,000); bonds, \$20,011,800. It appeared that no dividends had been paid on the common stock since 1904. The annual interest charges amounted to \$952,583.

The book cost of its property, after deducting items disallowed by the master, was \$28,574,225; and this, if divided according to mileage, would give to Minnesota as its share, \$17,127,390. The mileage basis of division, however, fails to take account of the fact that the property in Minnesota has a greater relative value.

The master found the total value of the property in Minnesota on the basis of the cost of reproduction new to be \$21,608,464. In this estimate there was included the sum of \$5,999,397.90 for lands, yards and terminals. Of this amount \$4,556,298 was allowed for the lands in Minneapolis on the estimate of the same appraisers who had been employed in that city by the other companies; and to this the master added 5 per cent. The lands outside these terminals were valued at \$1,215,285.

The net earnings of the entire system, after paying only operating expenses and taxes, from 1903 to 1909, were found to be as follows: 1903, \$1,398,895.30; 1904, \$1,229,524.49; 1905, \$1,277,870.96; 1906, \$1,511,961.99; 1907, \$1,419,822.54; 1908, \$1,220,862.21; 1909, \$1,286,494.08.

The net earnings of the company on all its business in Minnesota, interstate and intrastate (involving any use of the property valued as stated, after paying only operating expenses and taxes, were, during the same period: 1903, \$1,222,941.77; 1904, \$1,052,478.74; 1905, \$1,054,853.35; 1906, \$1,109,260.56; 1907, \$895,977.-

66; 1908, \$742,377.46; 1909, \$794,472.58. The reference in each case is to the fiscal year ending on June 30.

It thus appears that the net return from the entire Minnesota business in 1907 was about 4.14 per cent on the estimated value of the property (\$21,608,464) in Minnesota; in 1908, less than 3.5 per cent; and in 1909, less than 3.7 per cent.

The master made his computations, with respect to the return permitted under the rates in question, upon the operations of the fiscal year ending June 30, 1907. The class rates had been effective from Nov. 15, 1906, and the passenger fare act from May 1, 1907. It was estimated by the master that the additional loss, which would have accrued in the intrastate business if these rates had been in force during the entire fiscal year ending June 30, 1907, and if in addition the commodity rate act, which was enjoined, had been applied to the intrastate traffic of that year, would have amounted to \$131,358, thus making a very serious reduction in a return already inadequate; and his conclusion was that the rates in question were plainly confiscatory.

It is not necessary here to reproduce the computations, as we are satisfied, after a careful examination of the evidence, that while the methods of estimating value and of apportionment, which have been disapproved in the discussion of the cases of the other companies are subject to the same objections in this case, so far as they have been employed, the margin of error which may be imputed to them is not sufficiently great to change the result. The net return from the entire business in Minnesota, interstate and intrastate, fell to \$742,000 in the fiscal year ending June 30, 1908, and it is plain that the latter amount would have been largely reduced had the commodity rate act been enforced. In view of the actual results of the business in the state, and the clearly established facts with respect to the conditions of traffic upon this road, the conclusion cannot be escaped that the rates prescribed by the acts and orders of Minnesota would not permit a fair return to this company.

ROAD'S SITUATION IS PECULIAR.

Without approving, therefore, the methods of calculation which have been adopted, but recognizing the peculiar situation of this road, and the undoubted effect of the rates in question upon its revenues, we are of the opinion that the decree, so far as it rests upon the confiscatory character of the rates as applied to this com-

pany, should be affirmed. In the desire, however, to prevent the possibility that the decree may operate injuriously in the future, we shall modify it by providing that the members of the Railroad and Warehouse Commission, and the attorney-general of the state, may apply at any time to the court by bill or otherwise, as they may be advised, for a further order or decree whenever it shall appear that, by reason of a change in circumstances, the rates fixed by the state's acts and orders are sufficient to yield to the company reasonable compensation for the services rendered.

The decrees in Numbers 291 and 292 are reversed and the cases remanded with directions to dismiss the bills respectively without prejudice.

The decree in Number 293 is modified as stated in the opinion and, as modified, is affirmed.

Mr. Justice McKenna concurs in the result.

RAILWAY VALUATION IN KANSAS.

BY C. C. WITT, ENGINEER.

[Acting under powers conferred upon them by the laws of 1911 the Public Utilities Commission of the state of Kansas employed C. C. Witt as engineer, who commenced the work of appraisal of the physical property of all the railways operating in the state. The following is a portion of his report to Nov. 1, 1912:]

In this state we have undertaken to secure the cost to reproduce the property new and the present physical value. It is hoped to secure the original cost later. The other factors mentioned in the *Smythe vs. Ames* case are principally accounting items.

THE COST TO REPRODUCE NEW.

"The cost to reproduce new" is an estimate of the cost of building the property in its entirety; that is, financing, purchasing or condemning the right-of-way, constructing the roadbed, buildings, etc., just as they exist at the date of appraisal, assuming that all railroad property has been wiped out of existence and is to be replaced with new materials; prices of materials and labor as of the date of the appraisal. This is an impossible assumption.

THE PRESENT PHYSICAL VALUE.

"The present physical value" is an estimate of the value of the physical property as it exists today in its depreciated or appreciated condition, and of necessity takes into consideration the existence of the property throughout its actual past life. Several things must be borne in mind. Efficiency is not a measure of cost or value. Cost and value are two different items. There may be several values depending upon the purpose for which value is estimated, but cost is a fixed amount for all purposes.

A partially worn tie or locomotive that has seen several years' service may have as good an operating efficiency as when new, but the value of the unit to render its peculiar service, when measured by the remaining available life of the unit, is constantly decreasing. It is the depreciated value due to the unit's depreciated condition that is represented by the appraisal headed "Present Physical Value," or, in other words, it is the cost new, less the

depreciation due to use or weather stress, obsolescence or inadequacy.

ORIGINAL COSTS.

Actual original costs are extremely difficult to secure, for many reasons. Quite frequently the original records have been destroyed, accidentally or otherwise, and in a good many cases no accurate records were kept, and frequently in the exchange of properties the original cost records were not transferred; so that in the case of old roads it is nearly always necessary to estimate, in part at least, the original cost.

RIGHT-OF-WAY.

There is no other item that has been discussed as much as right-of-way values. The courts have held that the railroad company, although an investor in land dedicated to a public use, and not having a fee simple in the land acquired by eminent domain, is nevertheless entitled to any increase in value, regardless of the cause of increase.

If the appraisal is of "the cost to reproduce new," land must be treated as any other item, and an estimate made of the cost of securing the right-of-way, including all severance and other damages, as if the present right-of-way, station grounds and terminals were not owned by the company, but had to be secured by the methods commonly pursued, all improvements and conditions of abutting property being as they actually exist at the date of appraisal.

If the appraisal is of the "present physical value," the element of time or past existence of the property as railroad right-of-way must be considered. The land itself has increased in value in proportion to the increase of abutting property, but the money paid for severance damages, engineering, legal expenses and other expenses of acquisition has not increased, and should be stated as of original costs. When once accounted for, this item is settled for all time.

For the purpose of securing the present market value of the railroad right-of-way and station grounds if the same were devoted to other purposes, the assessed value of all farm land through which the railway extends and of all abutting lands in towns and cities was secured from the tax commission and the records in each county. We also secured a record of all bona fide sales (that

is, excluding quitclaim, foreclosure deeds, etc., and deeds for nominal considerations) and assessments in the last three years of lands in the vicinity and of a similar class to those occupied by the railroad right-of-way; also the assessment ratio of each township (that is, the ratio between market value as evidenced by bona fide sales and the assessment); also opinions of experts, real estate agents, bank cashiers and others as to the fair average market value.

For determining the amount of probable damages to be paid by the railway company, or excess or multiple cost, records of purchases of right-of-way and condemnation suits, etc., for a number of lines were compiled and the resulting figures compared with the market value, at the time of purchase, of the land through which the railroad passes. From these figures it appears that the total cost of the right-of-way for extended sections ranges from $2\frac{1}{4}$ to $2\frac{1}{2}$ times the market value of the property through which it passes, while individual tracts range from donations to ten times the market value.

Research has also shown that the multiple is larger for farm property than for town property, and that the larger the town and more expensive the land, the less the multiple or increased cost becomes. It is difficult to assign a ratio that will fit all cases. However, it seems to be true that a right-of-way purchased through farm property will cost about $2\frac{3}{4}$ times the fair market value, while if the property has to be condemned it will cost over three times the fair market value. Small towns and villages will cost about $2\frac{1}{2}$ times, towns of 10,000 population will cost a little over two times, while large cities of over 100,000 population will cost from $1\frac{1}{2}$ times to two times.

The fact must not be lost sight of that, although land is purchased or condemned, it frequently happens that a bonus is paid to the company sufficient to offset this excess cost and sometimes to pay for the right-of-way itself. Again, in estimating damages to be paid, it is generally considered that the farm as a whole has been damaged; that is, the damage is assessed at so much per acre for the remaining land. As a matter of fact, the farm has not been damaged to any appreciable extent, as is evidenced by the fact that the property through which a railroad passes sells for as high a price as similar adjacent land, and if another railroad passes through the same property, or it is desired to buy an additional

strip alongside the old right-of-way, the same per cent of excess cost for damages has to be paid, showing that this question of damages is almost entirely a sentimental one as regards land. Of course, this does not apply to exceptional cases, where a man's barn is separated from his house, or it is necessary to remove some of his buildings, destroy wells, orchards, etc.

In estimating the amount actually paid in excess of the fair market value, to be used in the appraisal of the "present physical value," the average farm values in the state of Kansas for the last 50 years have been plotted, assuming that roads built prior to 1875 were constructed almost entirely through farm or wild lands with only a few small towns, and that those constructed more recently have met with larger towns and better improved farms. A second curve has been plotted, with values three times the average farm values for 1860, decreasing to $2\frac{1}{2}$ times the average farm value for 1910.

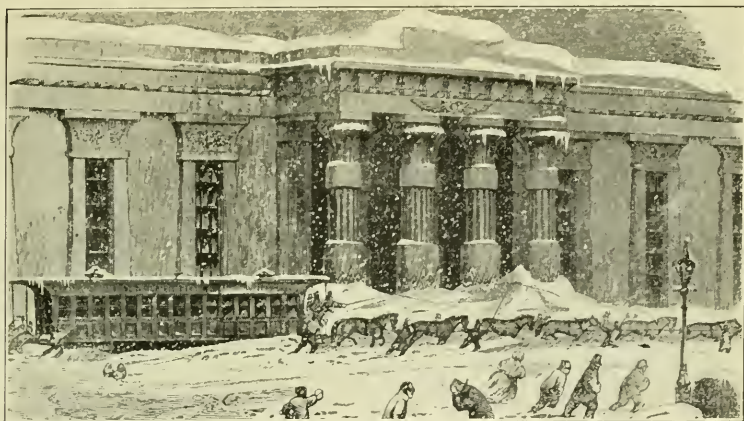
This is an assumption in excess of the facts, as a great deal of the main line right-of-way in this state was secured through United States government land grants, and many miles of branch lines have been donated or the money to pay for the right-of-way has been raised and turned over to the constructing company by the county. This is offset to some extent by excessive cost of line revisions.

The space between these curves, representing the excess original cost of the right-of-way above the market value of the land at that time, is the following per cent of the present market value for the stated period. Therefore, knowing the date of construction and the present market value of the property through which the railway passes, reference to the table will give the per cent of the "present market value" that represents the original excess cost.

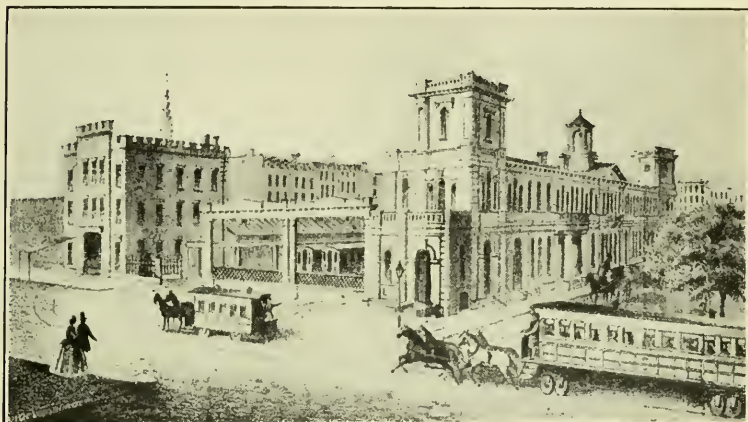
Year.	Per Cent.
1860	42 $\frac{1}{2}$
1865	44 $\frac{2}{5}$
1870	47 $\frac{1}{2}$
1875	50 $\frac{3}{5}$
1880	55
1885	60
1890	66 $\frac{1}{4}$
1895	75
1900	87 $\frac{1}{2}$
1905	102 $\frac{1}{2}$
1910	150

EVOLUTION OF GRAND CENTRAL TERMINAL

NEW YORK CENTRAL LINES, NEW YORK



In Front of Old Tombs Prison—En Route from City Hall to 26th Street Station



Station, 4th Avenue and 26th Street, 1857—Present site Madison Square Garden



First Grand Central Station, 1871—Prior to Remodeling, 1900



The Great Outbound Concourse for Through Passengers



Cross Section of Main Building Showing the Ramps or Inclined Walks
That Take the Place of Stairways

NEW YORK'S GRAND CENTRAL TERMINAL.

BY FRANCIS A. BONNER.

When the mere ground space to accommodate a railway car, exclusive of the vast outlay for terminal construction, reaches a value of \$30,000, it needs no wizard of finance to realize how serious a problem confronted the New York Central in planning its new Grand Central Terminal. It is because a similar problem of high ground values on central locations—lesser in degree, it is true—confronts railroads in every other large city that the terminal just finished by this railway—a radical departure from all precedent, and pointing the solution—marks a new era in terminal construction.

The most extensive passenger terminal development ever undertaken in America, and the third on its site, the new station, constructed by the New York Central & Hudson River Railroad for its use jointly with the New York, New Haven & Hartford, involved an expenditure so vast as to have been practically prohibitive for terminal purposes alone; the terminal itself, starting as it does with 21,000,000 passengers yearly, never could be made to pay interest on so huge an investment. Yet the gigantic problem was solved simply. Although the completed terminal covers more than twenty city blocks, the Company's station and offices themselves need occupy but little of this area. Utilization of electricity has enabled the tracks, the hundreds of trains, all the vast machinery to be placed underground, while above, with the sky itself as a limit, remain the "air rights" over the railway's own right of way.

It is utilization of these air rights that forms the most striking innovation in the new terminal. To secure a return on this expensive property, located in the heart of uptown New York, a group of semi-public buildings has been erected, returns from the lease of which will pay in part the interest on the land investment.

So it is that the new terminal, far different from the usual array of railway buildings and train sheds, creates in reality a new civic center. Two hotels, an office building, the Grand Central Palace for wholesale furniture displays, the Adams Express Company building, apartment buildings, clubs, etc., form the group. It is an achievement of paradoxes. Trebling in area the old station, trebling its car capacity, multiplying by five the traffic capacity, yet twenty

city blocks have been reclaimed and thrown open for building purposes, and two miles of street have been restored to public use! It is probably the largest and most successful combination of the aesthetic and the practical yet achieved in America.

Scarcely less notable, however, was the feat of building this giant terminal while still utilizing the old. Because of the necessity of maintaining traffic without interruption it was possible to withdraw only a small portion of the old terminal from service at a time, and the corresponding section of the new must be completed before another section was disturbed. Yet provision was made to accommodate the heavy traffic of two railroads, reaching forty-two movements per hour at certain periods of the day, and the task was achieved without delay, with only two tracks in use between Fiftieth and Fifty-sixth streets for several months! Time, cost and difficulties were vastly increased, but the result has been a lesson in efficiency which should satisfy the most exacting of modern reformers.

Efficiency, so applied in the work of construction, is typified in marble, stone and steel in every detail of the vast completed plan. If one aim was placed above all others by the designers it was facilitating movement, first by separating incoming from outgoing passengers—thus avoiding counter-currents; second, by eliminating all bends, making the channel itself direct the course of movement; third, by revival of the ancient ramp to replace the dangerous stair.

The result was two distinct though connected buildings for outbound and inbound travel, and five levels where the old terminal had but one. The gallery on the grade at Forty-second street is the top level; next is the concourse, almost on the level of the forty-two tracks for through trains; third, the concourse over suburban tracks; fourth, the twenty-five tracks for suburban trains; and still under these are the subways for handling inbound and outbound baggage.

Distinctly the feature of the structure is the outbound building, facing on Forty-second street between Vanderbilt avenue and Depew place, and extending north to Forty-fifth street. It is 672 feet long by 310 feet wide and seven stories high, though provision is made for adding thirteen stories, when needed. Here are the offices of the railway companies. The base and lower portion are of Stony Creek granite, with Bedford limestone above. In style of architecture it resembles somewhat the Doric and more directly the Tuscan, modified by French Renaissance. The front on Forty-second street,

opposite Park avenue, is set off by three high arched windows, surrounded by massive pillars and surmounted by a large statuary group representing Progress, Mental and Physical Force.

As an essential part of the station, a new elevated street starts at Fortieth street and Park avenue, crosses over Forty-second and divides, passing around both sides of the building and coming down to grade of the present street at Forty-fifth street, opening a new avenue for vehicle traffic north and south and relieving the congestion on Lexington and Madison avenues. The portion of the roadway parallel to Forty-second street, in front of the station, is fifty feet wide and is protected on the outside by an ornamental stone balustrade, while cork insulation under the roadway prevents disturbance to the stores located under the driveway on the level of Forty-second street.

The three main entrances for foot-passengers are on Forty-second street, one at the southeast corner at Depew place, one at the southwest corner at Vanderbilt avenue and the third in the main center archway opposite Park avenue. The corner entrances, through which most passengers enter, lead directly to the express and suburban concourses by separate ramps, while the third leads through the waiting room to the express concourse. The waiting room thus is removed from the stream of traffic and need be used only by those actually waiting for trains. Other entrances are at Forty-third street on Depew place and Vanderbilt avenue. Two cab entrances are provided, one on Vanderbilt avenue and Forty-third street under the overhead driveway, for the use of passengers without luggage; the other north of the main concourse and adjacent to the baggage room, for passengers with luggage.

As the waiting room, concourses and platforms are on different levels and all below the street, an elaborate system of ramps was designed. During construction temporary ramps were in service, the results carefully watched, and from the experience gained here the maximum gradient was determined at 11.6 per cent. Stairways, always dangerous where used by large numbers, exist only in auxiliary passageways where the amount of traffic is light. Since about eighty per cent of people arriving and departing use the subway, the elevation of the main concourse floor on the express level was made practically the same as that of the mezzanine or ticket office floor of the subway. Direct entrance from the subway to the concourse also is provided without passing through the waiting room.

The most prominent interior feature of the station is this main concourse, where all facilities are provided for making travel arrangements, including ticket offices, information bureau, baggage and parcel rooms, telegraph offices, telephone booths, etc. The concourse is 375 feet long, 120 feet wide and 125 feet high to an arched roof, with further extensions in the gallery at either end. It is a room finished in Botticino marble and buff-tinted stone, three immense arched windows on Depew place and three on Vanderbilt avenue opposite Forty-third street forming the ends. The arched ceiling is painted turquoise blue, and presents a view of a section of the heavens as seen from October to March, or from Aquarius to Cancer.

Facilities for travelers are arranged in the order of usual preparations. Directly in the center is the information booth, octagonal in shape, surmounted by a large clock. Forty-eight ticket windows extend along the south side in two groups, those for the New York Central being west of the main entrance and those for the New Haven road east. Under the balcony at the east end is the baggage checking room, connected with the main baggage room by pneumatic tubes. On the north side of the room, opposite the ticket windows, are the gates and indicators leading to trains.

The main waiting room is between Forty-second street and this concourse, slightly above it and below the street, connected with both by short ramps. This room measures 65 feet by 205 feet in size, and is finished in buff stone and marble. In direct connection are men's and women's waiting rooms; in the women's rooms being telephones, hairdressing parlors and shoe shining shops; and convenient to the men's, or smoking room, being barber shops, public and private, baths and private dressing rooms.

Below the main concourse and similar to it in general details is the suburban concourse. A broad ramp to this from the subway, a marble corridor forty feet wide, is one of the most beautiful features of the station. Ticket offices and other facilities again are complete on this level, and near by are restaurant, lunch room and a women's rest room. The baggage room, north of the main concourse, is directly over two wide platforms on the express level, exclusively for solid baggage trains, and by means of an elaborate system of lifts and subways baggage may be taken to or from trains anywhere in the station completely apart from the streams of pas-

sengers. Across Depew place from this room are the facilities for handling mail and express, also fitted elaborately with lifts and subways for connection with trains.

Immediately west of the outbound station, between Madison avenue and Vanderbilt avenue on Forty-third street, the inbound station further divides traffic, itself separated again to express and suburban levels. So inbound passengers need never see outbound; through passengers need never see local. This structure measures 200 by 150 feet, exclusive of a cab stand 190 by 68 feet. Inbound express trains are diverted at Fifty-seventh or Fifty-second street to the five westerly tracks, which connect with a loop running under the inbound and outbound stations and run back along the east side of the yard. As trains, after unloading passengers, thus may proceed around the loop, and provision for car storing, cleaning and restocking is made on the east side, the four parallel tracks at the neck of the station, to which the two stories of terminal tracks converge, thus relieved of almost all outward empty movement, are virtually doubled in capacity. When again due to leave, cars may be placed on any of the twenty-two stub end outbound tracks of the express level or the eleven tracks for loading of baggage. There are three storage yards for equipment on this level, twenty feet below the street.

Twenty-four feet below the express tracks the suburban network presents similar facilities, except that here are two loops instead of one, a sharper curve being provided for multiple unit trains than is possible for the regular equipment, which takes the larger curve. With ample storage yards here also, equipment coming in during morning rush hours may be cleaned and held until evening for the outward rush, and the neck again relieved of all backing out of empties. Entrance to this level is on four tracks with a maximum three per cent gradient. All track construction is on a layer of concrete, sloped from the center to facilitate drainage, in which creosoted blocks are imbedded, nineteen to the 33-foot rail. Screw spikes and heavy tie plates are used for the 105-pound rail. A large plant at Fiftieth street, between Lexington and Park avenues provides for lighting, heating and the elaborate system of forced ventilation, with washed, cooled air. Hot water for heating the general office, postoffice and station buildings travels more than a mile before returning to the heating plant.

Such, in meagre outline, is this latest word in metropolitan railway terminals. To tell in detail its many wonders were to journey far beyond the limits of our available space, but recourse may be had to the more concise method of tabulation.

SOME FIGURES OF INTEREST.

Total area old terminal.....	23 acres
Total area new terminal.....	79 acres
Total weight of steel work.....	118,597 tons
Area of express level.....	46.4 acres
Forty-two tracks, express level, length.....	19.5 miles
Platforms, express level, length.....	5.8 miles
Area suburban level.....	32.8 acres
Twenty-five tracks, suburban level, length.....	14.1 miles
Platforms, suburban level, length.....	2.5 miles
Total tracks, length.....	33.6 miles
Total platforms, length.....	8.3 miles
Excavation, old masonry.....	24,309 cubic yards
Excavation, rock.....	1,862,646 cubic yards
Excavation, unclassified.....	1,207,796 cubic yards
Excavation, total.....	3,094,751 cubic yards
Average depth, mainly in rock.....	50 feet
Length, station, street level.....	672 feet
Length below street level.....	745 feet
Width stations at street level.....	310 feet
Width below street level.....	455 feet
Height above street level.....	150 feet
Depth below street level.....	45 feet
Capacity old terminal.....	366 cars
Capacity, new terminal.....	1,053 cars
Capacity outbound concourse.....	15,000 persons
Capacity inbound concourse.....	8,000 persons
Capacity waiting rooms.....	5,000 persons
Possible trains out per hour.....	200
Traffic average old terminal per <i>day</i>	60,000 passengers
Traffic capacity new terminal per <i>hour</i>	70,000 passengers
Annual traffic old terminal.....	21,000,000 passengers
Possible annual traffic, new terminal.....	100,000,000 passengers

Requirements for many years to come have been kept in mind by the builders of the new station, as may be realized from these figures. But there is a lesson in the advent of this third structure which brings home what James J. Hill means when he points out the problem of enlarged terminal facilities for American railroads. When the first Grand Central station was finished, Commodore Vanderbilt, under whose eye the work had been done, escorted a company of friends through the building. With a sweep of his arm to the vast arched glass roof, he said the station would be good for all railroad business coming into New York for fifty years to come.

"It will be standing long after I am gone," said he. "It will be my best monument."

In ten years it was necessary to build an addition to accommodate incoming trains. A few years later congestion again was so great that the need of enlarged space was felt. In 1898 traffic had so far outgrown facilities that extensive enlargements and alterations came again. In another ten years no enlargement of the old station could hope to meet the requirements even of a decade's growth. And so comes the new Grand Central Terminal.

“SAFETY FIRST” THE SLOGAN.

WORK OF THE FEDERAL GOVERNMENT IN THE PREVENTION OF
RAILROAD ACCIDENTS.

BY COMMISSIONER C. C. McCHORD.¹

Railroad accidents, their causes, and the means for their prevention is a subject which has caused general discussion in this country for many years past; and not without reason. When we learn that during the twenty-four years covered by the statistics of the Interstate Commerce Commission 188,037 persons have been killed and 1,395,618 persons injured on the railroads of the United States, we are appalled at the magnitude of the slaughter. This is an average of 7,835 persons killed and 58,150 injured each year, or an annual total of nearly 66,000 persons killed and injured. This means that for every day during the past twenty-four years 181 persons have been killed or injured—nearly 8 every hour, or one every seven minutes, with the regularity of clockwork. The ravages of war pale into insignificance before these silent indications of the destruction of human life accompanying the peaceful operation of our railroads.

It is pertinent to inquire how much of this fearful record of slaughter is due to the unavoidable risk of the industry, and how much to causes that can be eliminated, as means for the prevention of accidents must obviously be directed to the latter causes.

Upon analysis of the above totals one cannot fail to be impressed by the surprisingly large number of trespassers they include. No figures pertaining to trespassers appear in the Commission's statistics previous to 1890, and as no returns of accidents to "other persons" were received by the Commission for the year 1910, owing to a change in the law requiring reports of accidents, we have a complete record of accidents to trespassers for only the twenty-year period 1890 to 1909 inclusive. This record is sufficiently startling. There were 163,171 persons killed and 1,190,125 injured during this twenty-year period. Of the number killed, 101,629, or more than 62 per cent of the total, are classified as "other persons," that is,

¹ An address delivered before the Association of Iron and Steel Electrical Engineers at Milwaukee, Wis., October 1, 1912.

they were neither passengers nor employes, and of these 101,629 "other persons," 86,733, or more than 86 per cent, were killed while trespassing. The trespassers killed during this twenty-year period were more than 53 per cent of the whole number of persons killed on railroads.

Of the 1,190,125 persons injured during this period, 142,040, or more than 11 per cent, were "other persons," and of this number 94,646, or more than 66 per cent, were trespassers. The trespassers injured constitute less than 8 per cent of the whole number of persons injured.

The following is a tabular presentation of these facts:

PERSONS KILLED AND INJURED IN RAILROAD ACCIDENTS DURING THE TWENTY-YEAR PERIOD 1890 TO 1909 INCLUSIVE.

	Number Killed.	Number Injured.
All classes	163,171	1,190,125
Other persons	101,629	142,040
Trespassers	86,733	94,646
	Per Cent.	Per Cent.
Other persons to all classes.....	62.2	11.9
Trespassers to other persons.....	85.3	66.7
Trespassers to all classes.....	53.9	7.9

In the five-year period from 1905 to 1909 inclusive, 31,091 other persons were killed; 26,291 of these were trespassers. In the same period 49,786 other persons were injured, of which number 28,205 were trespassers. A significant feature connected with these figures is the surprisingly large number of trespassers killed by being struck by trains, locomotives or cars at "other points along the track," Of the 26,291 deaths to trespassers during this five-year period, 17,469 were due to this cause. The extremely fatal nature of this class of accidents is indicated by the fact that while more than 17,000 persons were killed less than 10,000 were injured, the deaths exceeding the injuries in a ratio of 1.76 to 1. It may also be noted that while more than 53 per cent of all the persons killed during the twenty-year period from 1890 to 1909 were trespassers, less than 8 per cent of the total persons injured were trespassers.

Public attention for many years has been centered upon the question of abolishing grade crossings. While it is of course desirable that all possible precaution should be taken for the prevention of accidents at highway crossings, it is, nevertheless, true that the highway crossing casualties are extremely few as compared with those occurring at other points along the track. In the

five-year period above shown, 4,261 persons were killed at highway crossings, as compared with 17,861 persons killed at other points along the track; 8,830 persons were injured at highway crossings, as compared with 10,686 injured at other points along the track. Of the persons killed at highway crossings, 3,231 were non-trespassers and 1,030 were trespassers; of the persons killed at other points along the track, 17,469 were trespassers, while only 392 were non-trespassers. Of the persons injured at highway crossings, 7,540 were non-trespassers and 1,290 were trespassers; of those injured at other points along the track, 9,929 were trespassers and only 757 were non-trespassers. The casualties to non-trespassers at other points along the tracks are so comparatively few in number that they may safely be left out of consideration. It is probable that practically all of them occur to persons engaged in loading or unloading cars in railroad yards, and it is doubtful that persons engaged in such work can be surrounded with additional safeguards. When it is considered, however, that more than half of the fatal accidents on railroads in this country occur to persons who have no right upon railroad premises, it becomes apparent that there is a fertile field for reform in the method of dealing with trespassers. In England and on the continent of Europe walking on railroad tracks is forbidden by law, and it should be here; furthermore, vigorous measures should be undertaken to make people understand that railroad tracks cannot be used as footwalks with impunity.

Coming now to accidents to employes and passengers, we enter a field in which the Federal Government has displayed considerable activity, the result of which can be measured with a fair degree of accuracy. There are certain accidents which occur with more or less regularity and frequency on railroads that may properly be called unavoidable. Such are accidents due to exceptional elemental disturbances, entirely unexpected landslides or washouts, want of ordinary precaution on the part of passengers or employes, malicious tampering with roadway or equipment, etc. Such accidents are accepted as among the ordinary hazards of railroading and may be dismissed from our reckoning. We deplore the casualties which accompany such accidents, just as we deplore the loss of life that accompanies the destruction of a ship in a great storm at sea, but in the one case as in the other we know that no human foresight could have prevented the accident.

There are accidents however, which are fairly preventable, and against the occurrence of which travelers and employes on railroads have a right to demand protection. It is important, therefore, to determine the causes of these preventable accidents in order that proper measures for their prevention may be undertaken. The safety appliance act of 1893 was the first attempt of the Federal Government to deal with railroad accidents. This law dealt with a class of accidents the cause of which was plainly apparent. The killing and maiming of employes through the use of link-and-pin couplers and drawbars of uneven height had been a crying evil for many years. Railroad journals had advocated reforms; state railroad commissions had discussed the question, and in some states laws had been enacted requiring the use of automatic couplers. But these state laws had made the situation worse rather than better, as they led to the adoption of different types of couplers for the different states, thus destroying uniformity that is essential to safety where cars are universally interchanged, as is the practice on the railroads of this country.

With this situation in mind the Interstate Commerce Commission, through its secretary, Mr. Edward A. Moseley, began its agitation in 1889 for the abolition of the death-dealing link-and-pin coupler, for a standard height of drawbar, for grabirons on cars, and for power brakes on locomotives and cars. Uniformity in practice was the urgent need and it was apparent that uniformity could not be obtained without Federal legislation.

The first safety appliance act, passed March 2, 1893, made it unlawful after January 1, 1898, for any railroad engaged in interstate commerce to use on its line in moving interstate traffic any locomotive not equipped with a power driving wheel brake and appliances for operating the train brake system, or to run any train in such traffic that had not a sufficient number of cars in it equipped with power brakes so that the engineer could control the speed of the train without requiring brakemen to use the common hand brake for that purpose.

The purpose of this requirement was to reduce the number of injuries and fatalities caused by men falling from the tops of cars or being struck by overhead obstructions while using the hand brake. The act also made it unlawful to use cars not equipped with couplers that would couple automatically by impact and which could be uncoupled without the necessity of men going between the ends

of the cars. It was further made unlawful after January 1, 1895, to use in interstate commerce cars not provided with secure grabirons on their ends and sides. Carriers were authorized to refuse to receive cars not lawfully equipped. The American Railway Association was authorized to prescribe a standard height for drawbars, which was to be legalized by an order of the Commission.

Owing to the prompt action of the American Railway Association, the Commission was able to announce the standard height of drawbars one month after the passage of the act. The time limit for compliance with the brake and coupler provisions was twice extended, so that the law did not become fully operative until August 1, 1900. Experience soon demonstrated the need of amendment, as the requirement that a "sufficient" number of cars should be equipped with train brakes to insure control proved too indefinite to be enforcible. To remedy this defect an amendment to the act, approved March 2, 1903, provided that a minimum of 50 per cent of the cars in a train must be so equipped, and the Commission was given power to increase this number from time to time. It was made 85 per cent on September 1, 1910, and so remains.

Further experience with the law demonstrated the need of an extension of its provisions to cover all the appliances included in the Master Car Builder's standards for the protection of trainmen, as there was such a lack of uniformity in the design, location and methods of applying certain of these appliances as to make them a source of danger to employes. To meet this difficulty, therefore, a supplemental act, passed April 14, 1910, requires the equipment of cars with secure sill steps, ladders, running boards, efficient hand brakes, and grabirons on the roofs of cars. The Commission was required to designate the number, dimensions, location, and manner of application of these appliances within six months from the passage of the act, the provisions of which became effective on July 1, 1911. The commission was also empowered to extend the time for compliance with the provisions of the act with respect to equipment of cars actually in service on the date of its passage. As a result of numerous conferences and hearings, the Commission, on March 13, 1911, issued an order designating in detail the number, dimensions, location and manner of appliance of all appliances covered by the act, and a further order extending the time for compliance with its provisions with respect to cars actually in service on July 1, 1911. Speaking generally, these extensions range from

one to five years, except that when a car is shopped for extensive repairs at any time before the expiration of the period of extension, it must be made to comply with the prescribed standards.

What have been the results of this legislation? To secure its enforcement the Commission in 1899 appointed an inspector to examine railroad equipment. Aided by Congressional appropriation, this practice has been extended until the inspection force now numbers 31 men. This inspection was recognized as a necessity, as the protection contemplated by the law demanded that the appliances it required should not only be supplied, but that they must also be kept in workable condition. Recognizing its remedial character, the courts as a rule have placed a liberal construction on the provisions of the law, and as a result of this, coupled with careful and efficient methods of inspection, great improvement in the condition of safety appliance equipment has resulted.

The year 1904 is the first one for which we have a complete record of the results of inspection. In that year the number of cars found defective in every 1,000 cars inspected was 311.87. In 1911, however, only seven years later, the situation had so much improved that of every 1,000 cars inspected only 44.63 were found defective, a reduction of 267.24 in number of defective cars per 1,000 inspected, or more than 85 per cent in this comparatively short period.

This improvement in the condition of safety appliance equipment quite naturally brought about a corresponding decrease in the number of those accidents to employes which the use of the appliances was designed to prevent. In the year 1893, for instance, the number of employes killed in coupling accidents was 433 and the number injured was 11,277. The number per million equipment then was 333 employes killed and 8,675 injured in coupling accidents. The total equipment in the year 1893 was 1.3 millions, but .3 million of which was equipped with automatic couplers. In 1911, with 2.4 millions equipment, all of which had automatic couplers, 209 employes were killed and 2,966 injured in coupling accidents, an average of but 87 killed and 1,236 injured per million equipment, thus showing a reduction from 11,710 to 3,175 in the total of deaths and injuries from this cause, or a decrease of nearly 73 per cent. The showing per million equipment, as might be expected, is even better, the deaths and injuries on this basis being reduced from a total of 9,008 in 1893 to 1,325 in 1911, or more than 85 per cent. This decrease in coupling accidents is even more favorable than it first appears, for it

has taken place coincidentally with an expansion of business which has resulted in the crowding of tracks and terminals and the use of heavier equipment and longer trains, thus introducing additional elements of risk. This additional risk is indicated by the following figures:

In 1893 the number of tons carried on the railroads of the United States was 745,119,482; in 1911 the number was 1,781,638,043, an increase over 1893 of 1,036,518,561 tons. The number of tons carried one mile was 93,588,111,833, in 1893, as against 253,783,701,839 in 1911, an increase of 160,195,590,006 ton miles. With this increase in traffic came a relative decrease in the number of men directly employed to handle it. The number of trainmen employed by the railroads in the United States in 1893 was 146,544, and in 1911 it was 221,426. The average number of tons in a train in 1893 was 184; this had increased to 383 in 1911, or more than 100 per cent. The number of tons carried for each trainman employed in 1893 was 5,085; in 1911 it was 8,046, an increase of 2,961 tons per man. The number of tons carried one mile for each trainman employed increased from 638,635 in 1893 to 1,146,133 in 1911. This increase was effected notwithstanding there was a decrease in the number of train miles run for each trainman employed, the figures being 5,764 in 1893 and 5,589 in 1911. These facts appear in tabular form as follows:

	1893.	1911.
Number of tons carried.....	745,119,482	1,781,638,043
Number of tons carried one mile.....	93,588,111,833	253,783,701,839
Average number of tons in train.....	184	383
Number of trainmen employed.....	146,544	221,426
Number of tons carried for each trainman employed	5,085	8,046
Number of tons carried one mile for each trainman employed.....	638,635	1,146,133
Number of train miles run for each train- man employed.....	5,764	5,589

In the light of the record, it may safely be asserted that, considering the accidents to employes which the coupler and air brake laws were designed to prevent, the greater part of those which now occur are due to the ordinary hazards of the railroading industry. It is also proper to observe that the use of these appliances, in addition to so greatly reducing accidents to employes, has brought abundant returns to the railroads in economies of operation. Not only is time saved in the make-up and movement of trains by the use of the automatic coupler and air brake, but it is also certain

that the great economies of modern transportation that have resulted from heavier equipment and longer trains would have been quite impossible of realization without the use of the appliances prescribed by the safety appliance acts.

Leaving those accidents the causes of which are plain and against the occurrence of which the law seems to have provided efficient safeguards, we come to a class of train accidents upon which public attention has been centered for many years but which continue to occur with distressing frequency in spite of all measures thus far taken to prevent them. Collisions and derailments were responsible for 4,163 deaths, 63,002 injuries, and a property loss of \$50,025,303 during the five-year period 1907 to 1911 inclusive. The number of collisions and derailments during this period, as reported by the Interstate Commerce Commission, was 61,806. No road can claim immunity from these accidents, as they occur on the best equipped and best managed roads quite as frequently as on roads less well managed or equipped. Moreover, there is a dreary monotony in the sameness of the reported causes of these accidents. Year after year derailments and collisions due to identical causes are reported.

For the purpose of obtaining reliable data regarding the causes of these accidents, Congress enacted a law in 1901 requiring interstate railroads to make monthly reports under oath to the Interstate Commerce Commission of all collisions and derailments, giving the nature and cause of the accidents and the circumstances connected therewith. It was expected that through the reports required by this law the causes of the accidents reported upon would be revealed and proper remedies for their prevention clearly indicated. Under the law the Commission has published a series of quarterly bulletins based upon the monthly reports received from the railroads. The publication of these bulletins began with the quarter ending September 30, 1901, and the bulletin for each subsequent quarter until June 30, 1911, contains detailed accounts of the more prominent train accidents, with a statement of their causes as reported by the railroad companies. Since July 1, 1911, the bulletins have reported the causes of collisions and derailments under another law which will be later referred to.

The publication of these bulletins quickly brought into prominence the weakness of the personal equation in railroading, showing that by far the greater number of these harrowing train accidents

were due to human error. The bulletins show that errors in the operation of the train order system are frequent and fatal. Such errors are all of a kind. Dispatchers give wrong orders, or fail to give orders where they are required; operators fail to copy orders correctly, or do not deliver orders that should be delivered; conductors and enginemen misread, misinterpret, overlook or forget orders.

This weakness of the train order system of operating trains, as disclosed by the Commission's accident bulletins, gave impetus to agitation for the compulsory use of the block system. In its annual report for the year 1903 the Commission recommended such legislation and submitted a draft of a tentative bill requiring the use of the block system on all interstate lines within a certain period. A bill following the suggestions of the Commission was introduced in Congress in the winter of 1905, and has been reintroduced at every subsequent session, but has not yet been enacted into law. In the meantime, the block system has been considerably extended, the block signal mileage reported for the year 1911 being 76,409.7 miles as against 48,743.2 miles in 1906.

However, notwithstanding the theoretical merits of the block system as a means of safety, it by no means insures immunity from collisions. Some of the worst collisions noted in the accident bulletins have occurred on block signaled roads. Obviously, the block system can only afford protection when its danger warnings are observed and obeyed. The intensity of attention and quickness of perception required of enginemen on our modern, high-speed trains leads to the result that they sometimes fail to observe or obey signal indications, and when this happens, disastrous consequences are almost sure to follow. In the operation of the manual block system also, block operators sometimes make mistakes which lead to fatal results.

Noting these disasters, due to human error, under the most highly approved system of train operation, the question naturally suggested itself: "Is it not possible to employ mechanical means that will automatically assume control of a train and bring it to a stop whenever a danger signal is for any reason disregarded?" Automatic stops had been in successful operation for several years on underground and elevated lines, but their general use on roads in the open country was not considered practicable. To determine the general practicability of such devices, therefore, Congress, in 1906, directed the

Commission to conduct an investigation, accompanied by experimental tests, of appliances for the automatic control of trains. To comply with the direction of Congress the Commission appointed a board of experts, which conducted an investigation extending over a period of nearly five years. Plans and specifications of numerous automatic train control devices were examined and reported upon, and tests of several such devices under actual operating conditions were made. Reports stating the results of the board's investigations were issued annually. The last of these reports, issued December 26, 1911, states that "the information obtained from tests, together with knowledge of the general state of development of the art of automatic train control, leads the board to conclude that there are several types of apparatus and methods of application which, if put into use by railroads, would quickly develop to a degree of efficiency adequate to meet all reasonable demands. Such devices properly installed and maintained would add materially to safety in the operation of trains. In many situations, under conditions existing in this country, the board is convinced that the use of automatic train stops is necessary to the safety of trains."

Another matter made prominent by the accident bulletins was the long hours of service to which train employes were subjected. Accidents were reported in the bulletins where the employes involved had been on duty an excessive number of hours, and it seemed apparent that such accidents were largely contributed to, if not directly caused by excessive periods of service. Could events be traced to their first cause it would doubtless have appeared that many of the reported cases of misreading, overlooking or forgetting orders were also due to the fact that wits were dulled and senses benumbed by lack of rest.

When the facts in this situation became sufficiently prominent, Congress took prompt action, and on March 4, 1910, a law was passed limiting the hours of labor of trainmen and telegraph operators. The law became effective one year from the date of its passage, and has been enforced by the Commission with the aid of a force of inspectors which now numbers six men.

Whether the enforcement of the hours of service law has resulted in any increase of safety in train operation it is impossible to say, as a statistical presentation of results cannot be made. That the law has been of great benefit to employes, however, is certain. No longer do we hear of trainmen being kept on duty forty, fifty or

sixty hours in the ordinary process of moving their trains over a 100-mile division of road. Such excessive periods of service, which were formerly quite common, are now only met with in those extraordinary emergencies which furnish a legitimate and excusable reason for excess service. As a result there can be no doubt that the efficiency and morale of railroad train service has improved. Furthermore, the economic result of the law's operation is believed to be of benefit to the railroads. Trains are moved over the road in less time than formerly, and the number of train miles run for each trainman employed has considerably increased since the law became effective. This increase is especially significant in view of the fact that there was a steady decrease in this item for a number of years previous to 1908, the figures being 5,764 train miles run for each trainman employed in 1893, which had been reduced to 5,420 in 1908. In 1911 the number was 5,589, showing an increase of 169 miles as compared with 1908. The number of tons carried for each trainman employed was 7,358 in 1908 and 8,046 in 1911, an increase of 688 tons. The number of tons carried one mile for each trainman employed was 1,048,238 in 1908, and 1,146,133 in 1911, an increase of 97,895 tons in this item. On the whole, therefore, it would seem that the economic results under the operation of the law have been satisfactory.

Experience with the accident report law soon developed the fact that its underlying purpose, which was to secure accurate information respecting the actual cause of train accidents, could not be accomplished by relying upon the reports made by railroad managers. Railroad officials often seemed to think it their duty to withhold essential facts on account of some real or fancied liability that might impair the company's rights or interests in future court proceedings. Some companies seemed to have adopted a settled policy of furnishing the least possible information on all matters connected with accidents on their lines. Moreover, it was found impracticable to formulate a code of questions that would elicit satisfactory answers by letter in cases where the cause of a collision or derailment was at all complicated or obscure, or where the responsibility was chargeable to two or more persons. In such cases cross-examination is necessary to get at the true facts.

It became apparent, therefore, that independent investigations, conducted under authority of the Federal government, were necessary to develop the true facts, and after an agitation extending over

a period of six years a law authorizing such investigations was placed on the Federal statute books on May 6, 1910.

This law empowers the Commission to investigate all collisions, derailments or other accidents resulting in serious injury to persons or to the property of a railroad engaged in interstate commerce. This provision is in addition to the requirement that carriers shall make report of all accidents monthly, on forms prescribed by the Commission, which remains as in the law of 1901. The Commission is authorized to employ any impartial investigator to inquire into all the facts, conditions and circumstances surrounding any accident investigated, and is clothed with ample authority to get all the facts.

Investigations under this law are made by the Commission's safety appliance and hours of service inspectors, under the direction of the chief of the division of safety appliance, and reports showing the causes of accidents investigated are made to the Commission by the chief of the division of safety appliances. These reports are summarized in the quarterly accident bulletins, such summaries taking the place of the detailed reports of important accidents which are published in the bulletins under the law of 1901, publication of which was discontinued on June 30, 1911.

Investigations under this law began in June, 1911, and up to date eighty-five accidents have been investigated and reported upon by the various inspectors. The chief of the division of safety appliances has submitted his reports to the Commission on seventy-two of these accidents and fifty-three have been summarized in accident bulletins 41, 42 and 43. Detailed reports of the more important accidents investigated have been printed as separate documents by the Commission.

In the investigation of a number of prominent accidents involving the failure of rails, the resources of the Bureau of Standards of the Department of Commerce and Labor have been utilized. This bureau is well equipped with facilities necessary for making tests of the physical and chemical properties of rails, and its engineer-physicist, Dr. Howard, is one of the most capable rail experts in this country. The aid rendered by the bureau has been of much service in disclosing the underlying causes of serious rail failures. The examinations made by Dr. Howard have been painstaking and thorough, and the conclusions reached by him have the weight of authority.

Coming now to the causes of the accidents that have been investigated under the terms of this law, we find many instances of bad practice and are able to indicate certain unsafe methods of operation which should be changed. The investigations have not yet proceeded far enough to indicate the need of any specific legislation other than that which has already been proposed, but they have confirmed the need of a law for the compulsory use of the block system, and for the use of automatic stops in certain situations, as also for a uniform code of signals and rules, a bill providing for which has already been introduced in Congress.

The inherent weakness of the train order system appears from the fact that of 47 collisions investigated, 23 were due to failure of conductors or enginemen to understand or obey orders; mistakes of dispatchers or operators in issuing, transmitting, copying or delivering orders; forgetting or failing to keep clear of superior class trains; misreading watches, and improperly checking train register. These identical errors have been the cause of collisions with more or less frequency throughout all the years the train order system has been in operation. They occur under both the double and single order system, as well as with the intermediate order, and are inevitable wherever absolute reliance is placed upon the human element. It is universally admitted that the defects of the train order system cannot be cured by any improvement in the details of its operation. The only certain remedy is some form of block system that will insure the maintenance of an interval of space between moving trains.

But, as previously noted, collisions also occur under the block system. Such accidents in most cases are due to improper flagging or to failure of enginemen to observe or obey signals. Occasionally, where manually operated signals are in use, collisions are caused by mistakes on the part of signalmen. In short, collisions under the block system are due to the same fundamental cause as under the train order system, namely, human error. From the standpoint of safety, the block system is superior to the train order system only because it presents fewer opportunities for man to make mistakes.

To prevent collisions, therefore, we must reduce the chance of human error to a minimum, and introduce measures to neutralize its effects when it does occur. This is a trite conclusion, but it is sometimes necessary to re-state a truism in order that the importance

of a too familiar fact may be made prominent. To reduce the chance of human error in the operation of trains is a problem that has occupied the attention of railroad managers for many years. Rules innumerable have been formulated with this end in view, and various disciplinary measures have been undertaken for the enforcement of such rules. But the results have not been entirely satisfactory. Why? Mainly because the rules, as well as the disciplinary measures for their enforcement, have too often been mere makeshifts. Rules have been violated with impunity, with the full knowledge of officials whose duty it was to enforce them, and disciplinary measures have been applied only in cases where disaster has followed disobedience. The crying need in railway service today is a sensible and entirely workable code of rules governing the operation of trains; a code that can be obeyed under all conditions of operation; a code the primary purpose of which shall be the prevention of accidents rather than the avoidance of legal responsibility for their occurrence.

The remarkable increase in speed and weight of trains within recent years, and the crowding of tracks and terminals caused by movement of the enormously enlarged volume of railroad traffic, have greatly increased the duties of employes and multiplied the chances of error on their part. Rules which a few years back were perhaps reasonable and proper can no longer be observed and comply with the demands of traffic. Many such rules have remained in force although it is well known that they are honored more in the breach than in the observance of them. Such a condition cannot fail to weaken respect for all rules and render really effective discipline impossible. Whenever it becomes the unwritten law on a railroad that schedules must be maintained and trains moved over the road regardless of rules that have been enacted to secure safety, the conditions of disaster on that road are ever present and its managers are gambling with fate. A terribly disastrous, head-end collision, caused by a train approaching a meeting point for another train at excessive speed, was due to disobedience of a rule requiring the air brakes to be controlled from the leading engine of a double-header. At the investigation of the accident the trainmaster of the railroad testified that this rule was habitually disregarded with his full knowledge. He also said that a rule which required all trains to make a running test of air brakes was not expected to be obeyed except by passenger train crews.

Excessive speed as a factor in train accidents deserves serious consideration. A number of derailments investigated were directly due to speed too high for the existing conditions of track or road-bed, and in several serious collisions high speed was an important factor. It is, of course, extremely difficult, if not impossible, to say absolutely what is a safe limit for the speed of trains. With heavy rails, well maintained track and roadway, properly spaced signals, and track kept clear of slow trains, high speed trains can be run with comparative safety. But the effort to maintain the schedules of these fast trains, and to bring them in on time, creates an undesirable mental condition and increases the chances of mistakes by employes. In a collision involving a high speed passenger train upon one of our best equipped and operated railroads the towerman at an interlocking plant lined up the switches for a freight train to make a cross-over movement, the fast train coming from the opposite direction being several minutes late. Before the freight train movement had been completed the fast train approached and whistled for a clear track. In his anxiety to facilitate the passage of the fast train, the towerman forgot that the switches were lined up for the freight train and changed them so that the fast train might proceed. The towerman was clearly responsible for the resulting collision, but behind his mistake there was the anxiety that there should be no delay to the fast train, a mental condition which affects all employes in greater or less degree.

This mental condition, this desire to bring the fast train in on time at all hazards, leads to the disobedience of many rules, and such disobedience is often winked at by the very officials whose duty it is to enforce the rules. Trainmen are thus encouraged to take dangerous chances, knowing that if they come through without accident their infraction of the rules will be ignored. It thus happens that most of the accidents to high speed trains are directly caused by failure of some employe to perform his duty. Many such accidents occur through failure of enginemen properly to control speed at dangerous points. In the rear-end collision on the Illinois Central at Kinmundy, Ill., on Jan. 22, 1912, the standing train was struck at a speed of at least thirty miles per hour, although a speed limit of ten miles per hour for all trains was in force through the station limits at Kinmundy.

Failure of railway officials to determine with scientific accuracy the limits of safety, especially with respect to speed on curves, no

doubt has led to many derailments. There are no accurate engineering data showing the actual stresses which are set up in railway track structures by locomotives and cars of different weights and moving at different rates of speed. That an enormous strain is placed upon the track by our heavy modern trains, hauled by engines weighing upward of 200 tons, at sixty miles or more per hour, is beyond question. There is urgent need for accurate information on this point.

In a number of derailments investigation showed that track conditions were unsafe for the movement of trains at even ordinary speed, and no adequate measures had been taken by those in authority to insure speed reductions. This condition is by no means confined to the less prominent roads where no special effort is made to run trains at phenomenal speed, but has also been found on the more prominent roads in connection with the most widely advertised, high-speed trains in the country. It is apparent, therefore, that both collisions and derailments can be materially reduced by the introduction of adequate measures for the enforcement of speed restrictions where conditions demand it.

Investigation of derailments due to broken rails has developed the fact that current specifications for the manufacture of rails are not adequate to guard against the most common type of fractures, and that the drop test does not reveal the presence of interior defects of a serious character. There is urgent need of reform in the requirements of the specifications, as well as in the methods of inspection at the mills, so as to insure that structurally sound rails will be obtained. This need is particularly urgent, in view of the constantly increasing strains to which rails are subjected, due to increase in the weight and speed of trains.

The superiority of the steel car, from the standpoint of safety, has been confirmed by the results of investigations, both with respect to collisions and derailments. Antiquated wooden cars have been totally destroyed, with serious results in loss of life and injury to persons, in accidents less severe than those involving steel cars, the occupants of which have escaped practically unscathed. The steel car is rapidly superseding the wooden car on practically all the prominent roads, and it may safely be predicted that unnecessary injury and loss of life in collisions and derailments, by reason of the use of antiquated and structurally unsound cars, will soon be a thing of the past.

Numerous accidents, due to the explosion of locomotive boilers, led to agitation for a law providing for Federal inspection of the boilers of locomotives used in interstate commerce, and such a law was enacted and received the approval of the president on February 17, 1911. This act makes it unlawful, from and after July 1, 1911, for any common carrier to use a steam locomotive in interstate commerce unless the boiler of such locomotive and the appurtenances thereof are in proper condition and safe to operate. The act also provides for the inspection of boilers, and authorizes the appointment by the president of a chief inspector, two assistant chief inspectors and the employment of 50 district inspectors. The chief inspector is directed to divide the territory of the United States into 50 inspection districts and to assign an inspector to each district. Provision is made for the establishment of a code of rules and instructions for the inspection of boilers. The rules are to be approved by the Interstate Commerce Commission, and the chief inspector is required to make annual reports to the Commission, as well as special reports covering the details of any accident that may have been caused by failure of a locomotive boiler or its appurtenances, whenever called upon by the Commission.

As soon as practicable after this law became effective the chief and assistant inspectors provided for were appointed by the president, and the 50 district inspectors were selected through competitive examination, conducted by the Civil Service Commission. Rules and instructions for the inspection and testing of locomotive boilers and their appurtenances were formulated by the chief inspector and adopted, after approval, by the Interstate Commerce Commission, after a hearing at which parties interested were represented, as provided by the law. These rules and instructions were promulgated by the Commission in a formal order dated June 2, 1911, and became effective July 1, 1911.

This law has not been in operation long enough to enable any statistical statement to be made concerning its effect in reducing the number of boiler explosions. There can be no doubt, however, that the law has had a good effect in enforcing better attention to the condition of boilers, and in retiring from service many boilers which did not meet the established standards of safety. The first annual report of the chief inspector will shortly appear, and this will no doubt contain information of value demonstrating the benefits of the law.

We have now passed in review the various measures taken by the federal government for the prevention of railroad accidents, with the results of their operation so far as known. No specific cure for these disasters can be offered, for none is at hand. Experience has shown, however, that the number and severity of railway accidents can be materially reduced by the introduction of methods and appliances which are entirely practicable, and it is particularly encouraging to note that there has recently occurred a general awakening among railroad managers and railway trainmen's organizations which has led to a well-organized movement on the more prominent railroads of the country to secure greater safety.

In the working out of this problem of greater safety on railroads we shall get no aid from a study of the railroads of other countries. Our problem is essentially peculiar to this country, and must be solved in the light of conditions existing here. The most difficult and perplexing factor in this problem is the personal equation. The failure of the man at the critical moment is the thing to be guarded against, and this involves generally a reformation in methods of discipline and rules of operation.

The publication of reports of accidents investigated by the federal government acts as a powerful tonic on the whole situation, as shiftless methods which endanger life and property cannot long endure in the light of merciless publicity.

Great possibilities in the direction of a solution of the problem lie in the organization of so-called safety committees. These are now features in the administration of many prominent roads, and the slogan, "safety first," has become a watchword in the details of their operation. In making safety the dominant idea in the minds of employes, by continually talking about it and pointing out methods for its attainment, an important step in the right direction is taken. It is necessary for the employe to think right before he can act right. These safety committees are also bound to be an important factor in reawakening in employes that old-time feeling of personal interest and pride in the record of "our road" that has been so largely dissipated by modern railroad development. In short, coöperation for definite results all along the line is bound to result from the well-directed efforts of these committees.

ACCIDENT INVESTIGATION.

REPORT ON COLLISION AT CORNING, N. Y., BY THE SECOND DISTRICT
PUBLIC SERVICE COMMISSION OF NEW YORK.

Rear-end collision between trains No. 9 and No. 11, on the Buffalo Division of the Delaware, Lackawanna and Western Railroad, July 4, 1912, near Corning, N. Y.

SUMMARY OF FACTS.

1. Trains involved in collision: No. 9 (The Buffalo Limited) and No. 11 (solid express), both westbound.

2. Train No. 9 was composed of 10-wheel type locomotive No. 1052 and 8-wheel type locomotive No. 973, one buffet car, eight sleeping cars, and two coaches. Train No. 11 was composed of 10-wheel type locomotive No. 1026, seven express cars, and one combination express and crew car.

3. Train No. 11 collided with the rear end of train No. 9 which was not moving, demolishing wooden coach No. 86, and then tearing into the end of steel coach No. 160, shoving the same about forty feet into the wooden sleeping car Esthonia, demolishing same.

4. Location: About $1\frac{1}{4}$ miles east of Corning Freight Station on the Buffalo Division of the Delaware, Lackawanna and Western Railroad.

5. Date and time: July 4, 1912, at 5:20 a. m.

6. Casualties: Forty persons were killed at the time of accident, or received injuries which resulted in death within a few hours; seventy-five persons were injured, ten of whom received injuries of a serious nature.

The commission presents herewith the report of Supervisor of Equipment A. Buchanan, Jr., of his investigation of the rear-end collision which occurred on the Buffalo Division of the Delaware, Lackawanna and Western Railroad near Corning, July 4, 1912. The principal data regarding this accident are summarized above.

CIRCUMSTANCES ATTENDING THE ACCIDENT.

These, as set forth more at large in Mr. Buchanan's report, are as follows:

"On the morning of July 4th, freight train No. 61 left Elmira at 3:52 a. m., and at 4:40 a. m. pulled in on siding at Corning Freight Station to clear train No. 9, which was due at 4:45 a. m.

"Extra freight train No. 393, consisting of engine No. 393 and 55 loaded coal cars and caboose (3,000 tons), left Elmira at 4:03 a. m. and arrived at east end of siding at Corning Freight Station (distance, 15.86 miles) at 4:46 a. m. On arrival at the east end of Corning Freight Station siding it was found that train No. 61 was not in on siding a sufficient distance to permit extra No. 393 also to occupy it and clear the main line. It was necessary for a trainman to go forward and instruct train No. 61 to pull further west on siding. Train No. 393 had in the meantime pulled in on siding about twenty-five car lengths, and was compelled to stop until train No. 61 proceeded west on siding. In again starting train No. 393, one of the sills on Delaware, Lackawanna and Western steel hopper coal car No. 72922 (located the twentieth car from engine) broke, causing the train to separate. Before this train came to a stop, Flagman Michael O'Conner had dropped off to flag train No. 9 between home signal 278.1 and distant signal 277.3, about 3,500 feet east of the rear end of train No. 393 when it came to a stop at the east end of siding.

"Train No. 9 (2 locomotives and 11 cars) left Elmira at 4:37 a. m., 15 minutes late. Arriving in the vicinity of Corning Freight Station they found signal 277.3 set at 'Caution,' and proceeded with caution. About 2,500 feet further west they found flagman of extra train No. 393 and torpedoes. The flagman of extra train No. 393 informed Engineer W. Still that train was pulling in on Corning Freight Station siding. Train No. 9 proceeded about 2,000 feet further west and found signal No. 278.1 set at 'Stop,' and stopped one minute in accordance with signal rules, and then proceeded with train under control, stopping again with rear end of train about 250 feet west of signal No. 278.1 which was set at 'Stop,' arriving at this position about 5:02 a. m. Flagman Edward J. Lane then started to protect his train, and proceeded east about 2,550 feet, or about half way between signal 278.1 located about 250 feet east of train No. 9 and set at 'Stop,' and signal No. 277.3 located about 4,474 feet east of train No. 9 and set at 'Caution.'

"In the meantime, engine No. 1052, the first engine of train No. 9, had been cut off to push the rear of disabled end of extra freight train No. 393 into Corning Freight Station siding.

"Train No. 11, consisting of 1 engine and 8 express cars, left Elmira at 5 a. m., 15 minutes late, and while running at a speed of from sixty to sixty-five miles per hour, Engineer William H. Schroe-

der ran past 'Caution' signal No. 277.3, the signals of Flagman Edward J. Lane and 'Stop' signal No. 278.1 and collided with the rear end of train No. 9, cutting through the entire length of wooden coach No. 86, completely demolishing it, and tearing into the end of steel coach No. 160 about eight feet, shoving same about forty feet into wooden Pullman sleeping car Esthonia, demolishing same. Steel coach No. 160 had in the meantime turned over on its right side, the front end of engine No. 1026 being close to the east end of steel coach No. 160. Wooden coach No. 86 was distributed on both sides of engine No. 1026 below the running boards. Train No. 9 was not moving at the time of the collision."

THE COMMISSION'S FINDING.

The investigation shows clearly that the primary cause was the entire failure of Engineer William H. Schroeder of train No. 11 to observe signals. The signaling system in use on the Lackawanna road is an automatic system actuated by means of electric track circuits, and compares favorably with the standard signaling systems used by the principal railways of the country. The evidence shows that the head train, No. 9, was protected by a full stop signal about 250 feet east of the rear of the train, by a flagman about 2,550 feet east, and by a caution signal nearly 4,500 feet east of train No. 9. Engineer Schroeder of train No. 11 disregarded all three, and appears to have run at full speed into the rear of the train ahead without making any effort to stop.

A study of the contributing causes to which the engineer attributes his failure to see the signals shows as follows:

The engineer states that the fog was so dense as to make it impracticable for him to see signals clearly. On the other hand, the evidence of other trainmen indicates that the fog had lifted sufficiently to allow the signals to be seen with a reasonable degree of clearness, and the testimony of one of the passengers on the train which was wrecked confirms this. If, however, the fog had been as dense as Engineer Schroeder stated, no excuse has been developed for his running at the rate of speed cited, 60 to 65 miles per hour, and there is no evidence to indicate that any pressure was brought to bear upon him to make time with his train under dangerous conditions, or in any way to exceed the limits of safety. The train which he was running carried express only and no passengers, and there is nothing to show that there was any need for high speed under unfavorable conditions. It further appears from

the engineer's statement that while he was running 60 miles per hour or over through a fog which made observation of signals difficult, he left his throttle and air-brake valve and went outside of the cab to make some repairs to the injector fittings which he considered necessary. In this connection, careful examination was made of the locomotive as soon as possible after the accident by two engineers in the employ of the commission, both of whom are thoroughly familiar with all of the details of locomotive construction and operation. This inspection shows that the engine was in first-class condition, which is confirmed by the engineer who ran the same engine on alternate days to Engineer Schroeder. The following statement in Mr. Buchanan's report appears, therefore, to be fully warranted:

"The injectors and all devices which require the attention of the engineer were found to be in good working condition, and the general condition of the engine was found to be good, with no defects which could in any way or under any circumstances relieve the engineer from his responsibility in connection with the observation of signals."

It is the custom of the commission in connection with the investigation of accidents to examine as far as possible all of the principal contributing causes. For instance, if an accident is caused by a locomotive breaking down, the causes which lead to such failure are carefully considered and an endeavor is made to locate the responsibility for the defects. The duty to examine contributing causes is equally binding in the case of a radical failure of the human element, such as caused this accident. Such investigation shows that the engineer had disregarded the duty of taking proper rest before attempting the important work of running this train, and had apparently left but little undone to unfit him for his work. He expected to be called at 3 o'clock in the morning, and his fireman was actually called at 2:45. It, however, appears from his own statement that he did not get to bed before 12 o'clock, and from other evidence not before 1 o'clock. He therefore did not have an opportunity for more than two or three hours' sleep if he had responded to the first call. He acknowledges drinking two glasses of gin in the evening before the accident, had visited several bar-rooms, and is reported by one witness to have been seen staggering on the street. He reached the train practically at leaving time; the fireman had registered for him at the engine house, and the oil-

ing and such inspection of the engine as was done appears also to have been attended to by the fireman. In view of these circumstances, we are satisfied that the engineer was unfit for his duties; and that this was the fear of the fireman is indicated by his being at the engineer's cab at the time of the accident, as such other explanations as the fireman has given are believed to be entirely inadequate. The conclusion of the inspector appears, therefore, to be fully warranted, and meets with the full concurrence of this commission, that "William H. Schroeder, engineer of train No. 11, is responsible for this accident."

As a result of this accident, the Lackawanna Railroad has modified one of its rules to read as follows:

"G (a). In furtherance of the objects of the several federal and state "Hours of Service" laws, employes in engine, train, yard, and station service are prohibited from using their time while off duty in a manner that may unfit them for the safe, prompt and efficient performance of their respective duties for the company. They are strictly enjoined and required to use their time while off duty primarily for obtaining ample rest.

"G (b). The use of intoxicants while on or off duty, or the visiting of saloons or places where liquor is sold, incapacitates men for railroad service, and is absolutely prohibited. Any violation of this rule by employes in engine, train, yard or station service will be sufficient cause for dismissal."

This order meets with the approval of the commission, and in securing its enforcement we believe that the company is entitled to the full coöperation of the Brotherhood of Locomotive Engineers and other associations of trainmen.

Flagman Lane of train No. 9 appears to have gone back a sufficient distance to give a reasonable warning under the circumstances of this case. He violated the rules by failing to take torpedoes with him, but the testimony indicates that the weather was sufficiently clear to justify him in refraining from the use of torpedoes under the company's rule that they shall not be used in block signal territory "except in foggy or stormy weather."

The use of torpedoes in this case might have been of doubtful value, but if the flagman had supplied himself with torpedoes, and if he had used them when he saw that train No. 11 was not slackening speed, it is possible that although Schroeder had closed his

eyes to the signals his mind might have been reached through his ears. Lane testifies that if he had had torpedoes with him he would have used them. This failure to have and use torpedoes at a critical time furnishes no excuse for the lamentable departure from duty on the part of Schroeder, but it is proper to note the failure. The operating rules should be so amended that flagmen may feel distinctly at liberty to use torpedoes under circumstances appearing to create special danger. While the indiscriminate use of torpedoes on all occasions of train protection by flagmen may be properly restrained, the rules should not contain restrictions calculated to cause a flagman to refrain from using them freely in time of apprehended danger although it may be daytime and the weather actually clear.

It should be remembered that safety from collision of modern high speed trains is rendered possible only by complete signal systems and by the observance of such signals by engineers. It is certainly well in many situations to use flagmen to supplement the protection given by signals. In this case William Still, engineer of train No. 9, knowing that there was to be a considerable delay, gave the whistle signal which required the flagman to go back. Trains are, however, frequently run in present high speed railroad practice so closely together and at such high speeds as to make it impossible for a flagman to afford any protection of value under certain limiting conditions. The main reliance must be placed upon the signals and upon their observance by the engineers, and it is possible that the practice in this country may eventually follow that of some of the railroads in England, on which flagging has been abandoned under all ordinary conditions of train service.

The delays to the preceding freight trains, the breaking of the sill in one of the steel coal cars, and other elements which led to the delay of train No. 9, and thus contributed to this accident, have been considered. These conditions, however, are such as must occur frequently in the operation of any great railroad, and the signals and their observance by employes should be such as to afford reasonable safety under these conditions.

The commission has also given much thought to the possible improvements of signaling systems, especially the overlap and the automatic stop. The full block overlap has received especial attention in connection with preceding accidents. Its adoption would result in spacing trains further apart and giving to each train the protection of two full stop signals a block apart, and a caution signal

an additional block in the rear of the train to be protected. In this case, however, the flagman constituted an additional signal, and although the distances were shorter than would be afforded by the full block overlap, we have no reason to believe that such an arrangement would have prevented the accident or have diminished its severity. The signals were sufficient if ordinary care had been used to observe them.

Unless some satisfactory method can be found to diminish accidents due to carelessness of employes, it appears evident that the use of automatic stops must be given much greater consideration in the future than in the past. The investigation of the Board of Train Control appointed by the Interstate Commerce Commission indicates that automatic stops are practicable, and if a satisfactory device of this kind had been installed on the section of track in question, and had been in proper working order, this accident would have been prevented. The problem, however, when considered in all its bearings, is a most serious one. Collisions are possible on almost every mile of railroad in the United States. If it should prove to be necessary to install automatic stops at each point of possible danger, the expense of installation and maintenance would be enormous, and we believe that the railroad development of the country generally is far from the point at which such a complete installation can be considered. The difficulty of maintaining present safety devices is very great, and the fear of railroad men that the increase of such devices may only change the location of the danger point has a solid foundation. There is an unusual element of danger in a so-called safety device which fails to operate. If an air-brake fails to work, or a signal shows a false "clear" indication, imminent danger is created from the fact that employes have learned to trust implicitly in these devices, and the speeds of trains and the intervals between them are regulated on the supposition that the automatic devices will work satisfactorily, or that when they fail it will be on the side of safety. There is danger, therefore, that the use of automatic stops may only shift the burden of responsibility from the experienced and skilful engineer, with his many years of training as a fireman, to the signal maintainer, and that much chance for accident may still remain. It should also be considered that the records of this commission show a large number of accidents caused by the defective operation of the emergency brake, especially on long trains. In many cases a lack of uniformity in the action of the

emergency valves appears to have caused a collision within the train itself, which buckles weak cars and has frequently blocked adjacent tracks with the wreckage thus produced. It is certain that the widespread installation of types of automatic stops which involve the emergency application of the brakes would produce some accidents of this class. We also have in mind the fact that the remarkable record of safety from collisions in English railroad operation is made under the protection of signal systems operated manually and without any automatic checks such as are afforded by the electric track circuit or the automatic stop. This collision is the only one involving death of passengers which has occurred in over twelve years on the main line of the Lackawanna Railroad under the daily operation of heavy traffic. Other railroads have also attained a high degree of safety. For instance, the Long Island Railroad, whose reports to this commission show a yearly movement of 34,000 passenger trains, has not had an accident involving the death of a passenger in nineteen years.

The best American signaling practice has, however, developed to such a point that the two main elements essential to the successful installation of automatic stops are already provided. These are a highly developed system in which the operation of the signals is actuated and safeguarded by electric track circuits, and the air-brake which enables trains to be stopped in the quickest possible space up to the limit which is fixed by the sliding of the wheels on the rails. Such automatic stops are used in electric tunnel operation in the New York subways, the Hudson and Manhattan tunnels, and in the Pennsylvania Railroad Terminal tunnels at New York City. Automatic stops are not provided, however, on the New York elevated railroads, and the difficulties of installation and operation of such devices are much increased by weather conditions such as are met in the winter operation of surface roads.

The perfection of an automatic stop device and experimentation by railroads as to its working in practical use under the most unfavorable conditions can not be too strongly urged. In saying this we feel bound to call attention as forcibly as we may to the fact that the use of an automatic stop will unavoidably create new dangers against which additional precautions must be devised. Its presence will have a marked tendency to cause a percentage of engineers to rely upon the stop rather than the observation of signals. No device involving the intricacy and delicate adjustment of an automatic

stop will at all times be in perfect working order in the weather conditions prevailing in this country, and an occasional failure is inevitable. If reliance is placed solely upon it, disaster at times must be expected. We have already spoken of the dangers of buckling upon double and four track roads arising from emergency application of the brakes.

Mr. Buchanan's statements in reference to steel cars are submitted for discussion and criticism. We think that they deserve consideration because of the careful personal examination which Mr. Buchanan has made of this and other wrecks.

Steel cars certainly appear to afford additional protection to life in accidents of this character, but there is room for discussion of their value as compared with wooden cars having steel underframes. Further and exhaustive examination of this matter is imperatively demanded. A large amount of progressive work has been done in this country in the construction of wooden cars, through close coupling, vestibules, and strong platforms, to reduce the danger in collision or derailment. The construction of American wooden cars appears to be far superior in safety to the passenger cars used in England or in Europe generally, and the effort to afford safety and comfort in the car construction of this country as compared with foreign practice is indicated by the great weight of American equipment in proportion to passengers carried.

Recent statistics given by the *Railway Age Gazette* show that in January of this year the passenger cars under construction were about 77 per cent steel, 16 per cent wood with steel underframes, and 7 per cent wood. The increase of steel and steel underframe passenger cars is shown by the following table:

CARS APPROXIMATELY IN SERVICE.

	Steel.	Steel Under- frame.
January 1, 1909.....	629	673
January 1, 1910.....	1,117	1,098
January 1, 1911.....	3,133	1,636
January 1, 1912.....	5,347	2,399
Increase 1912 over 1909.....	4,718	1,726
Increase 1912 over 1909.....	750%	256%

The indications are, we think, that the use of steel cars will increase rapidly in this State through the ordinary processes of addition and replacement, and through the necessities of electric operation in tunnels such as those at New York.

It is true that the recent derailment at Westport, on the New York, New Haven & Hartford railroad, again forcibly renews attention to this matter; nevertheless, as far as we understand the circumstances of that accident, the more important question to be considered is the same as in the accident under discussion: that is, what can be done to prevent similar accidents through improved signaling and by securing constant observance of signals by all locomotive engineers. There are of course other questions of weight which must not be overlooked.

The enormous cost which would be required to replace the present equipment of wooden cars in advance of the natural movement in that direction, coupled as it would be more or less with a diversion of funds needed for the prevention of accidents, to a purpose that only minimizes the effect of accidents which ought not to have occurred, is one of the considerations to be given proper weight in the study and investigation which we strongly favor.

Though an all steel car train may be desirable, and all steel car trains on some roads are run doubtless for the purpose of adding safety, it is quite another thing to require that a carrier shall not use its steel cars except where all other cars in its train are of that description. Mr. Buchanan's recommendation in that respect is therefore not accepted. We think two, or perhaps three, steel cars at the rear of a train might afford much protection; or even one such car, depending upon the severity of impact in a collision. A single steel car at the head of the train at Westport would probably have prevented the fire which destroyed the wooden cars.

In the latter connection, it should be considered that an enormous amount of money has been expended by the railways to diminish the fire risk through the equipment of practically all cars with steam heating appliances, and the use of safe methods of lighting. The separation of the fire in the locomotive from the nearest car by the steel tender, which is at least partly filled with water, is ordinarily a fire protection of great value. The whole subject is one which requires much more careful investigation than has yet been given to it before any governmental action would be warranted. Our study of the present accident renews the conviction that the question of supreme importance now is how to prevent accidents of this character rather than merely to minimize the effect of such accidents by replacing equipment which is already much heavier, stronger, and more costly than that used in other countries.

The Commission considers it to be unwise to devote so much attention to the possible protection which might be afforded by steel cars or by automatic appliances that the main lessons of this collision should be lost sight of: and these are first, that no permanent safety can be expected in railway operation except through the appreciation by all employes, not only those directly involved in train service, but those who maintain locomotives, tracks, and signals, of the importance of their duties and the need of careful attention to every detail of their work; and second, by the railway managers of the necessity of strict discipline and removal of men from the service who fail to meet a reasonable standard of performance of duty in matters involving safety. A high degree of efficiency in these elements appears to have been reached by the railways of England, and it is to be hoped that there is no prohibitive reason why such a condition should not be attained by the railways of this country. There is no doubt that the large majority of railway men perform their duties with great care and efficiency, and have a record to be proud of. The work of enginemen in particular is performed under conditions of stress of which the general public seems to have a most inadequate appreciation. The mere observation of signals upon high speed trains under varying conditions of light, storm, and fog is a severe strain. The slightest inattention while running at the rate of a mile a minute may result in the missing of a signal. A single error in observation may result in a disastrous accident. The insistent demand of the public for high speed under all circumstances is a keen spur to railroad managers to wink at if not demand high speed under all conditions.

Enginemen are prone to believe that a strict observance of the universal rule, that in cases of doubt the course of safety must be adopted, imperils his position and livelihood. Only words of praise should be applied to the general average performance of duty by enginemen. There are, however, in every class of men those who do not average up to the recognized standard of efficiency and faithfulness, and in the case of railroad employes such men imperil not only the lives of the traveling public, but also, what is of equal importance, the lives of their fellow employes. More train wrecks are occasioned by such men than by all other causes combined.

Our Annual Report to the Legislature for 1908, referring to accident investigations, stated:

"The reports of investigations of accidents upon steam railroads made to this commission during the year 1908 indicate that a very large proportion of all the accidents so investigated upon such roads during the past year have been caused by the failure of employes to obey standard operating rules or special instructions which were in force for the safe movement of trains."

Subsequent experience confirms this statement. The shielding by the faithful majority, or by any part of it, of the careless and inefficient minority from the results of its shortcomings is much to be condemned. It arises from a mistaken sense of loyalty to a fellow workman, and in the end its most disastrous consequences are visited upon the very people whose generosity and good nature are invoked to set it in motion. The reckless engineer is much more likely to kill or maim a fellow employe than he is to harm a passenger.

To secure radical improvement in the absolute prevention of railroad accidents it is the clear duty of organizations of employes, for the protection of themselves as well as the public, to co-operate vigorously and efficiently with the management in the strict enforcement of all rules affecting safety, in the proper punishment of whoever may be guilty of violating those rules, and in the removal from service of all who do not show themselves imbued with a constant desire to place safety of all above every other consideration. Failure to obey signal rules should be and is good ground for permanent removal from service unless clearly shown to have been without fault on the part of the employe.

The actions of Engineer Schroeder above outlined should be considered as much an offense against the Brotherhood of Locomotive Engineers, of which he is a member, as they are against the railway and the public.

Managers and superintendents should enforce discipline in such matters at any cost, and should never permit any reasonable ground for the charge that their desire for speed is more powerful than their desire for safety.

We also have reason to believe that improvement can be made by the railroads through the exercise of greater care in the selection of the roundhouse foremen, traveling engineers, and train-masters who directly supervise the handling of engines and trains. These positions should be made attractive enough to secure good

men who are not only competent in the technical side of their work but who are capable of dealing justly and fearlessly in matters of discipline. The authority of these men should be sustained by the officers above them unless they are proved to be in the wrong, and as long as they do faithful work they should be secure in their positions and be as well protected against arbitrary removal as locomotive engineers are now protected through the organization of their brotherhood.

WHY 5,000 TRESPASSERS ARE KILLED YEARLY.

DATA REGARDING 4,785 ARRESTS SHOW INEFFICIENT GOVERNMENT IS RESPONSIBLE; BETTER LAWS AND THEIR ENFORCEMENT THE REMEDY.

From the *Railway Age Gazette*.

Commissioner C. C. McChord, of the Interstate Commerce Commission, in an address at the Co-operative Safety Congress of the Association of Iron and Steel Electrical Engineers at Milwaukee, Wis., on October 1 gave figures showing that in the 20-year period 1890 to 1909, inclusive, fatalities to trespassers constituted 53.09 per cent of all the fatal accidents on the railways of the United States. He pointed out that the total number of persons killed was 163,171, and that of these 86,733 were trespassers. The Interstate Commerce Commission has given no figures regarding trespassers killed in 1910, but its statistics show that in 1911 there were 5,284, or 52 per cent of the total fatalities. Therefore, the proportion of trespassers killed to the total persons killed is being maintained.

The problem of reducing accidents is probably the most important problem with which railway managements, employes, regulating authorities and the public are today confronted. When it is found that a clear majority of all fatalities occurs to one class it becomes manifest that the most important part of the accident problem is that of reducing fatalities to these persons. Unfortunately, as the *Railway Age Gazette* often has pointed out, a very great deal more attention has been given to accidents to other classes than to this one. Doubtless this has been because the number and proportion of fatalities to trespassers has not been generally known and their causes have not been understood. Some have charged this class of accidents against the railway managements, and indicated that if they would properly police and fence their tracks and eliminate grade crossings the situation would be improved. Railway officers have replied that the real trouble is that there are few laws and ordinances relating to trespassing on railway property and that those there are are not enforced.

To get at the facts and so present them that the true state of the case and the necessary remedies may be made clear beyond question the *Railway Age Gazette* has obtained a great quantity of informa-

tion regarding the arrests of trespassers, who they are, by whom they are arrested, what they were doing, what charges were made against them, before what courts they were arraigned, what disposition was made of their cases and what the existing laws on the subject are. The information regarding arrests relates to arrests made mainly in June, July and August, 1912, and was gathered through the office of the chairman of the General Managers' Association of Chicago. It covers 4,785 arrests made on these railways which run through most parts of the United States. The information obtained, therefore, reflects conditions throughout the country.

TRESPASSING DUE TO INEFFICIENT GOVERNMENT.

One of the main purposes of governments is to protect citizens in their property rights. The owners of railways are citizens, for many legal purposes the corporations are citizens. Therefore, the property of railways is entitled to the same protection from intrusion as any other property. In order to protect the property of citizens the governments levy taxes. In proportion to the value of their properties railways are among the largest tax payers. Therefore, it is the duty of governments to protect the property of railways against trespassers from the same funds, and to the same extent, as the property of others. The facts show that practically no effort is made by public police officers to keep intruders off railway property. It is necessary for railroads to maintain their own police; and almost without exception the 4,785 trespassers arrested were arrested by the railway police.

Another important function of the government is to protect the lives and limbs of citizens. Trespassers are citizens. Every public official knows it is dangerous for people to trespass on railway property. But the information collected shows that the governments, national, state and municipal, make little effort to protect the lives and limbs of citizens from the hazards of trespassing. Every one of the persons was risking losing limb and life when arrested; and yet, of this total number only 2,183 received any punishment; and in many cases the punishments were so slight that they could have little tendency to deter the offender from repeating his offense.

THE REMARKABLE SITUATION IN CHICAGO.

The evidence shows that the elimination of grade crossings is almost futile as a means of preventing trespassing. The railways of Chicago in compliance with city ordinances have spent about \$70,000,000 on track elevation, and expect to spend a total of \$150,-

000,000. Yet trespassing on their elevations goes on daily, and this, despite the fact that there is a specific city ordinance prohibiting trespassing on the elevation. Trespassers on the elevation are arraigned before the judges of the municipal court. In the three months under review there were 339 arrests on the elevated right of way of only four systems, and the following table shows the disposition of the cases by the municipal court of Chicago:

	Arrested.	Punished.
Pennsylvania Lines west of Pittsburgh.....	172	32
Chicago & Alton.....	15	None
Chicago, Burlington & Quincy.....	52	7
Chicago & North Western.....	100	28
	<hr/> 339	<hr/> 67

In other words, less than one-fifth of the persons arrested for the specific offense of trespassing on the elevations were given any punishment. The elevation of the Chicago & Western Indiana and the Belt Railway is used by several roads. The records of the Western Indiana and Belt Railway do not refer specifically to trespassing on the elevation. They do show that during the period mentioned there were 160 arrests for trespassing which was not accompanied by any other offense. Doubtless, at least three-fourths of these arrests were for trespassing on the elevation; and in 95 of the cases the culprits were completely discharged; in 38 they were paroled, and in four they were turned over to the juvenile officer. This accounts for the disposition of 137 out of the 160 cases.

It is, therefore, a safe inference that in not more than 20 per cent of all the instances where arrests are made for trespassing on the elevation of the railways in Chicago is there any punishment. In other words, the elevation of tracks has not prevented trespassing, and the municipal court does extremely little to make effective the ordinance that was specifically enacted to protect the property of the railways from intrusion and the lives and limbs of the trespassers themselves from the results of their folly. The fact that the trespassing continues in such large volume shows the indifference and futility with which the public authorities of Chicago deal with this matter. There have been so many cases of trespassers in Chicago throwing stones at the passenger trains of the Chicago & North Western, which sometimes have passed through windows and struck passengers, that this road has put its own police on both night and day. And it is this same government of Chicago that has made the railways spend \$70,000,000 to elevate their tracks in the interest

of public safety, and will make them spend enough more to raise the amount to \$150,000,000.

GOVERNMENTS DO LITTLE ANYWHERE.

While the situation in Chicago is bad it is not much better in other parts of the country. The records show that the public officials of cities and towns are usually very reluctant to arrest or punish trespassers. In small places it is common for the courts to impose on them a suspended sentence, and give them a stated number of hours to leave town. Naturally, many of them go out as they came in—viz., on the tracks of the railway. To so great an extent is it impracticable to get persons punished for trespassing alone, that the railway police, whenever possible, arraign them on some other charge, as malicious mischief, or disorderly conduct, or vagrancy.

Investigation shows that, contrary to the general belief, most of the trespassers killed are not tramps, but citizens of the communities where they are killed. It would, in most cases, be futile for the railway police to arrest citizens of standing merely for trespassing; and ordinarily, of course, they cannot be arrested for anything else. Therefore, in a large majority of trespassing cases no arrests are made; and the large number of arrests made is but a slight indication of the amount of trespassing done.

The following table shows the number of arrests of trespassers and the number of punishments reported:

	Number Arrested.	Number Punished.
Chicago Great Western.....	121	78
Atchison, Topeka & S. F. Coast Lines.....	95	26
Atchison, Topeka & S. F. Western Lines.....	111	43
Atchison, Topeka & S. F. Eastern Lines.....	41	35
Pennsylvania Lines West of Pittsburgh.....	422	234
Grand Trunk.....	240	129
Rock Island Lines.....	38	37
Baltimore & Ohio, Chicago Terminal.....	302	30
Baltimore & Ohio.....	1,465	816
Northern Pacific.....	33	19
Michigan Central.....	25	23
Lake Shore.....	152	94
Chicago & North Western.....	131	34
Chicago & Alton.....	96	64
Chicago, Burlington & Quincy.....	93	39
Indiana Harbor Belt.....	18	9
New York, Chicago & St. Louis.....	473	227
Erie Railroad.....	726	215
Chicago & Western Indiana and The Belt Railway of Chicago	174	28
Chicago Junction.....	29	3
	<u>4,785</u>	<u>2,183</u>

The facts about the situation will, perhaps, be made most clear by giving detailed statements for several railways, based on the reports made by them.

CHICAGO & ALTON.

The record of the Chicago & Alton shows that the majority of its trespassing cases are those of minors who have been arrested on the track elevation in Chicago. In such cases a representative of the road usually gives the parents a warning to keep their children off the elevation. The road also has cards printed in different languages, giving the provisions of the juvenile law, which are left with the parents at the time they are notified.

Number Arrested	Cause	Disposition
57	Trespassing.....	17 sent to jail. 4 sent to jail over night. 10 fined \$50 and sentence suspended. 8 fined. 2 returned to state institution. 1 returned to parents—feeble-minded. 9 discharged. 1 paroled to probation officer. 2 paroled to juvenile officer. 2 paroled. 1 sent to John Worthy School.
3	Disorderly conduct.....	1 fined. 2 sent to jail.
8	Vagrancy.....	8 sent to jail.
13	Riding trains.....	2 bought tickets for passenger trains. 8 fined. 2 sent to jail. 1 jail over night and dismissed.
15	Trespassing on elevation.....	6 discharged. 9 taken home and given warning.
Total arrested, 96; total punished, 64.		

PENNSYLVANIA LINES WEST OF PITTSBURGH.

No railway management in the country has done more to reduce trespassing and the accidents it causes than that of the Pennsylvania system. On the lines west of Pittsburgh, as on the Pennsylvania Railroad, the road's police adapt themselves in their work to local laws and conditions. On the Northwest system all persons arrested in Chicago are prosecuted under the city track elevation ordinance. In Illinois there is no state law under which offenders can be prosecuted for trespassing on tracks at grade. In Indiana the road prosecutes under the state trespass law, but it must notify the trespasser to keep off before it can proceed against him. In Ohio prosecutions are made on the petit larceny charge when possible. Trespassers arrested riding trains are charged with violating the railroad law.

On the Eastern Division in Pennsylvania, trespassers caught riding trains are prosecuted under the trespass law. In all cases of train riding the person is arrested without warning. In cases of walking on the right of way the officers explain the danger and serve trespass notices. Before a legal arrest can be made in Pennsylvania, it is necessary that the property be posted according to law.

On the C. & P. Division, the greatest amount of trespassing is in the Cleveland district, and the road's police can only warn and serve notices, as the city police will not lock up any person charged with trespassing. Parties arrested for train riding and charged with violating the railroad law are usually discharged or let off with a suspended sentence.

On the Toledo, Akron and Marietta divisions of the Central System the railway police who find people loitering around the yards and stations order them away and serve regular trespass notices. The railway's patrolmen are required to ride freight trains. Men arrested for train riding are usually taken before the mayor of the town, and sometimes they are fined and sometimes released with a reprimand.

Number Arrested	Cause	Disposition
94	Trespassing on train.....	42 fined. 26 sent to jail. 22 discharged. 1 sent to workhouse. 2 sent to reformatory—suspended. 1 juvenile court.
86	Trespassing on elevation.....	16 fined. 9 paroled to juvenile officer. 4 paroled. 57 discharged.
126	Trespassing.....	26 sent to jail. 22 discharged. 1 sent to workhouse. 1 sentence suspended. 54 fined. 9 reprimanded. 1 sent to reformatory. 5 turned over to probation officer. 4 no record. 2 given one hour to leave town. 1 returned to infirmary.
18	Loitering.....	3 open docket. 3 fined. 5 discharged. 1 sent to jail. 6 released on probation.
4	Interfering with R. R. property	4 reprimanded.

Number Arrested	Cause	Disposition
5	Sleeping on train.....	3 released. 1 fined. 1 sentence suspended.
24	Riding trains.....	14 fined. 1 open docket. 3 sent to workhouse. 4 reprimanded. 2 dismissed.
7	Malicious mischief.....	2 fined. 1 sent to reformatory. 3 turned over to probation officer. 1 released.
5	Picking coal.....	1 released. 3 fined. 1 turned over to probation officer.
29	Violating R. R. law.....	7 sentence suspended. 8 sent to workhouse. 4 fined. 7 discharged. 3 given hours in jail.
22	Arrested for stealing coal.....	22 fined.
2	Trespassing and carrying concealed weapons.....	1 fined. 1 sent to jail.
Total arrested, 422, total punished, 234.		

CHICAGO, BURLINGTON & QUINCY.

The record obtained from the Chicago, Burlington & Quincy relates only to trespassing on the lines east of the Missouri river. The management indicates that on account of the courts along its lines being unwilling to punish trespassers only a few arrests are made, and that it is only in aggravated cases that the court can be prevailed on to taken any action.

Number Arrested	Cause	Disposition
52	Trespassing on elevation.....	38 discharged. 5 paroled. 6 fined. 1 fined \$200 and given sentence. 2 placed under \$200 peace bond.
33	Trespassing.....	13 dismissed. 20 fined.
2	Trespassing and carrying concealed weapons.....	2 fined \$75 and cost—jailed.
6	Trespassing and drunk.....	6 fined.
1	Trespassing and throwing rocks.	1 fined.
11	Disorderly conduct.....	9 fined. 2 dismissed.
4	Riding top of train.....	2 fined. 2 bound over.
1	Robbery.....	1 dismissed, insufficient evidence.
1	Uncoupling moving train.....	1 ten years in penitentiary.
Total arrested, 111; total punished, 43.		

CHICAGO & WESTERN INDIANA AND BELT RAILWAY.

The Chicago & Western Indiana and the Belt Railway of Chicago have special officers to patrol their right of way and question all parties whom they find trespassing on it and unless they give satisfactory answers they are arrested.

Number Arrested	Cause	Disposition
3	Trespassing on track.....	3 discharged.
2	Trespassing and grain sweeping.	1 paroled. 1 discharged.
160	Trespassing.....	95 discharged. 38 paroled. 21 fined. 1 under bond. 4 turned over to juvenile officer. 1 sent to detention hospital.
1	Violating R. R. law.....	1 discharged.
2	Trespassing and flipping.....	1 fined. 1 turned over to juvenile officer.
1	Trespassing and riding train....	1 fined.
1	Trespassing and disorderly	1 discharged.
1	Violating R. R. law and trespass- ing.....	1 discharged.
3	Trespassing and stone throwing.	3 sent home with warning.
Total arrested, 174; total punished, 28.		

CHICAGO & NORTH WESTERN.

The data furnished by the Chicago & North Western relates only to arrests in Chicago territory. The police of the road believe that conditions have improved regarding the number of people found loitering on the elevations and are satisfied that if the municipal court judges would be a little more severe trespassing could be reduced to a minimum in a short time. "But so many youngsters are discharged with a warning and paroled to juvenile officers, which is only another way of letting them go, that their arrests do not have the effect that they otherwise would." In June, 1911, the North Western posted its lines with notices written in different languages, cautioning people against trespassing and stating the penalty for doing so, but these notices were torn down almost as fast as they could be put up and few of them now remain.

Number Arrested	Cause	Disposition
4	Loitering on elevation.....	2 fined. 2 discharged.
20	Trespassing on elevation.....	11 fined. 4 discharged. 5 paroled to juvenile officer.
5	Jumping trains on elevation....	4 discharged. 1 fined.

Number Arrested	Cause	Disposition
10	Stoning trains.....	2 discharged. 8 taken to police station and released on promise of good behavior and to keep away from elevation.
3	Loitering and petty larceny.....	3 paroled.
1	Throwing coal off cars on eleva- tion.....	1 paroled to father.
5	Being on elevation.....	1 fined. 2 discharged. 2 to juvenile officer.
3	Opening cars on elevation.....	2 discharged. 1 to parental school.
17	Flipping on elevation.....	6 fined. 7 discharged. 4 paroled.
10	Coming on elevation to catch outgoing trains to steal rides..	10 discharged.
13	Riding engines.....	5 fined. 5 to juvenile officer. 1 discharged. 2 to juvenile court.
1	Stealing ride.....	1 discharged.
2	Riding on elevation.....	2 fined.
2	Riding pilot engine.....	2 discharged.
2	Flipping trains.....	2 discharged.
13	Stoning trains on elevation.....	All taken to station and taken in charge by juvenile officer and released on promise of good behavior.
20	Riding cars on elevation.....	13 paroled. 5 fined. 2 discharged.

Total arrested, 131; total punished, 34.

MICHIGAN CENTRAL.

An officer of the Michigan Central reports that at some points on that line, country and city officials are willing to prosecute and punish trespassers, while at other points they will not do so. He continues:

"For example, the city officials of Toledo are at all times willing to handle a case of trespass where a man or boy is caught riding on the head end of a passenger train or interferes with our work in the yards, while at Detroit the police will not prosecute or punish a trespasser of any kind unless his case is aggravated by theft or drunkenness. We are guided in our actions by what we know the police will do. In Toledo if a man or boy is caught on the head end of a train stealing a ride he is arrested whether the train be freight or passenger. In Detroit we are compelled to simply watch our trains and drive the trespassers away. There are numerous tramps around Detroit who go to the yards to ride out on freight trains. We are compelled to watch these trains with the greatest

of care, and often our men ride them out for several miles in an endeavor to get the trespassers off.

"On account of the petty depredations committed by these tramps we are compelled to use every effort possible to keep them from the trains. I find in visiting the towns along the line that very few of them have a rockpile on which to work prisoners who are arrested for misdemeanors or trespassing, nor have they any arrangement whereby the prisoner can be made to work out his fine. In these towns it cannot be expected that they will punish prisoners for trespassing. As a rule all over the line we cannot do much but drive away the tramp or boy who attempts to ride on our trains or interfere with the work of switchmen in the yards."

Number Arrested	Cause	Disposition
18	Riding trains.....	5 fined. 8 jail sentence. 3 fined and sent to jail. 2 sentence suspended.
5	Loitering and making trouble for employees.....	1 fined. 4 sent to jail for 10 days.
2	Wandering about freight yard at night with evident intention of stealing.....	2 fined.
Total arrested, 25; total punished, 23.		

LAKE SHORE & MICHIGAN SOUTHERN.

An officer of the Lake Shore & Michigan Southern writes:

"Whenever tramps, hard looking characters, or train riders are encountered in our yards they are driven off, and frequently placed under arrest. There are points, however, where it is useless to arrest trespassers on account of the authorities refusing to take action against such offenders. The reason given in most cases is that the municipalities do not care to be burdened with the expense of lodging vagrants and tramps, and action is seldom taken against them unless it is ascertained that they are able to pay a fine, in which case a small fine is generally imposed. Our policing of large yards is constant, and train riders are arrested wherever results can be obtained."

Number Arrested	Cause	Disposition
104	Train riding.....	37 jail sentence. 41 fined. 17 sentence suspended. 5 discharged. 2 sent to juvenile home. 2 sent to detention home.

Number Arrested	Cause	Disposition
27	Unlawful intrusion.....	22 sentence suspended. 1 jail sentence. 1 fined. 3 discharged.
3	Vagrancy.....	2 fined \$10, and given 10 days on rock pile. 1 jail sentence.
9	Trespassing.....	6 discharged. 1 fined \$11 and given 10 days in jail. 1 sentence suspended. 1 turned over to juvenile officer.
3	Malicious trespassing.....	3 fined.
1	Drunk and trespassing.....	1 fined \$5.
2	Drunk and disorderly.....	2 fined \$11 each.
3	Disorderly conduct.....	3 discharged.
Total arrested, 152; total punished, 94.		

BALTIMORE & OHIO RAILROAD.

Number Arrested	Cause	Disposition
1,465	Violation of R. R. laws.....	430 jail sentence. 146 workhouse sentence. 8 reformatory sentence. 232 fined. 529 paroled. 120 released unconditionally.
Total arrested, 1,465; total punished, 816.		

CHICAGO GREAT WESTERN.

The record of arrests on the Chicago Great Western is stated by the officers of the road to be incomplete because no attempt has been made to keep it complete.

Number Arrested	Cause	Disposition
2	Burglary and larceny.....	1 waiting next term of court. 1 fined and sent to jail.
64	Drunks.....	19 fined. 6 put to work on street. 18 jail sentence. 21 released.
19	Train riding.....	13 dismissed. 3 fined. 3 jail sentence.
23	Vagabonds or trespassers.....	22 put to work on street. 1 released.
4	Loitering.....	1 jail sentence. 2 discharged. 1 fined.
2	Breaking and entering.....	2 released.
7	Trespassing.....	3 released. 1 three days' labor. 2 jail sentence. 1 fined.

Total arrested, 121; total punished, 78.

BALTIMORE & OHIO, CHICAGO TERMINAL.

The B. & O. Chicago Terminal made a report covering the months of March, April and July because in May and June its police officers were engaged in protecting its freight house on account of the strike of freight handlers in Chicago. It is the practice on this road to have the offender brought into court, where, it is stated, he is usually let off with a reprimand and warning. If a juvenile, he is ordinarily paroled to the juvenile officer of his district.

Number Arrested	Cause	Disposition
137	Larceny.....	42 paroled. 5 fined. 2 sent to jail. 84 paroled to juvenile officer. 2 sent to reformatory. 2 put in \$500 bonds.
104	Trespassing.....	71 paroled. 18 paroled in \$200 bonds. 2 paroled in \$500 bonds. 3 paroled to juvenile officer. 4 fined. 6 sent to house of correction.
23	Disorderly conduct.....	20 paroled. 2 paroled in \$500 bonds. 1 sent to house of correction.
9	Violating R. R. law.....	2 fined. 7 paroled.
7	Malicious mischief.....	3 pending in criminal court. 1 fined. 2 paroled. 1 sent to house of correction, 23 days
14	R. S. P.....	14 nonsuited.
7	Burglary.....	2 fined. 1 sent to jail for 6 months. 3 sent to house of correction, 60 days. 1 nonsuited.
1	Assault and battery.....	1 paroled.
Total arrested, 302; total punished, 30.		

ERIE RAILROAD.

The following table shows the diligence with which the police of the Erie follow up cases of trespassing:

Number Arrested	Cause	Disposition
530	Train riding.....	57 fined. 219 sentence suspended. 70 bought tickets and were released. 71 discharged. 68 sent to jail. 2 sent to detention home. 31 ordered out of town. 2 ordered out of town account lockup being full.

Number Arrested	Cause	Disposition
530	Train riding (continued)	3 hard labor on streets, 5 days. 2 paroled. 4 sent to workhouse. 1 turned over to charity society; ran away and caught train riding again and turned over to juvenile court.
120	Trespassing.....	24 fined. 25 sentence suspended. 23 sent to jail. 11 ordered out of town. 24 discharged. 2 sent home to parents. 2 sent to reformatory. 1 sent home with parents. 3 paroled. 3 sent to workhouse. 2 put in charge of probation officer.
22	Trespassing and malicious mis- chief.....	6 sentence suspended. 5 turned over to juvenile officer. 11 fined.
4	Trespassing and breaking into gum machine.....	4 discharged.
4	Trespassing and breaking off lock on tool house.....	3 paroled. 1 sent to parents.
1	Trespassing and meddling with R. R. property.....	1 held for grand jury, \$500 bail.
2	Trespassing and cutting air hose on cars.....	2 held for action of grand jury.
9	Trespassing and vagrancy.....	5 sentence suspended. 4 sent to jail.
14	Trespassing and coal theft.....	7 fined. 5 paroled. 1 turned over to probation officer. 1 turned over to juvenile court.
2	Trespassing and theft of iron...	2 paroled.
4	Vagrancy.....	2 sent to jail. 2 sentence suspended.
8	Violating track elevation ordi- nance.....	3 fined. 5 discharged.
6	Begging at station.....	3 discharged. 2 sent to workhouse. 1 ordered out of town.

Total arrested, 726; total punished, 215.

NEW YORK, CHICAGO & ST. LOUIS.

This road has its police force ride trains and watch them through the principal towns, arresting trespassers, or, when practicable, compelling them to buy tickets. The data supplied by it is for the months of May, June and July, 1912.

Number Arrested	Disposition	
473	Number purchasing tickets.....	79
	Number fined or imprisoned.....	225
	Number discharged.....	57
	Number cases pending.....	4
	Number paroled.....	106
	Number escaped from jail.....	2
Total arrested, 473; total punished, 227.		

ROCK ISLAND LINES.

The information for these lines relates only to trespassers arrested on the First district. The management explains that the fact that all but one arrest was followed by punishment was due to the fact that the Rock Island's police exercise much care to arrest only those they are pretty sure can be convicted.

Number Arrested	Cause	Disposition
12	Train riding.....	5 fined. 6 jail sentence. 1 paroled.
14	Trespassing.....	12 fined. 2 jail sentence.
8	Disorderly conduct.....	8 fined.
2	Malicious mischief.....	2 one year in jail.
1	Robbery.....	1 still in jail.
1	Attempted robbery.....	1 sent to reform school.
Total arrested, 38; total punished, 37.		

GRAND TRUNK.

An officer of the Grand Trunk writes:

"We have special constables in our most important terminals to prevent trespassing as well as theft. Trainmen protect their trains from trespassers, and we also employ special agents for investigating thefts, frauds and assisting generally in the protection of property, etc. More assistance from prosecuting attorneys and police justices, particularly in Michigan, in convicting trespassers, would result in a gratifying reduction in the tramp element, which is a serious menace; and the need is a trespassers' act framed sufficiently drastic to insure its effectiveness."

Number Arrested	Cause	Disposition
182	Trespassing.....	3 suspended sentence. 52 fined. 44 sent to jail. 79 discharged. 2 sent to children's aid society. 2 sent to asylum.
4	Carrying concealed weapons....	4 sent to jail.

Number Arrested	Cause	Disposition
20	Disorderly conduct.....	13 discharged. 2 fined. 5 not given.
22	Stealing rides.....	20 sent to jail. 2 discharged.
10	Suspicion.....	4 sent to jail. 6 discharged.
2	Throwing stones.....	2 discharged.
Total arrested, 240; total punished, 130.		

NORTHERN PACIFIC.

The figures for the Northern Pacific cover only the lines east of Paradise. The policing method followed is to have watchmen at terminal points who make every effort to keep trespassers off trains. The laws against trespassing are not uniform in the different states through which the road runs, and in some states it is necessary to guard against arresting trespassers who could not be prosecuted.

Number Arrested	Cause	Disposition
6	Vagrancy.....	2 fined. 1 63 days on rock pile. 3 10 days on chain gang.
27	Trespassing.....	6 fined. 5 sent to jail. 13 ordered to leave town. 1 sentence suspended. 2 10 days on street.

Total arrested, 33; total punished, 19.

ATCHISON, TOPEKA & SANTA FE.

At its division and district terminals the Santa Fe has special officers permanently stationed who are in uniform at passenger train time and who police the station premises and yards. It also has train riders, who ride freight trains and look out for persons stealing rides. The road does not police its lines specifically to prevent trespassing, and ordinarily trespassers are arrested only when their actions arouse suspicion as to their intentions and when the officers are reasonably sure of obtaining convictions carrying jail sentences or fines.

EASTERN LINES.

Number Arrested	Cause	Disposition
41	Trespassing.....	1 discharged. 1 nolle prossed. 16 fined. 16 sent to jail. 3 given hours. 4 paroled.

Total arrested, 41; total punished, 35.

WESTERN LINES.

Number Arrested	Cause	Disposition
2	Petit larceny.....	2 fined.
72	Riding trains.....	25 ordered out of town. 15 sent to jail. 6 fined. 21 discharged. 1 probation. 4 \$20 or 20 days.
36	Vagrancy.....	21 ordered out of town. 15 fined.
1	Disorderly conduct.....	1 sent to jail.
Total arrested, 111; total punished, 43.		

COAST LINES.

Number Arrested	Cause	Disposition
68	Evading fare.....	3 released. 1 fined. 28 ordered out of town. 20 jail sentence. 12 discharged. 1 probation. 3 made to pay fare.
2	Petit larceny.....	2 fined.
2	Vagrancy.....	1 ordered out of town. 1 jail sentence.
1	Loafing.....	1 discharged.
1	Fighting.....	1 jail sentence.
20	Sleeping in cars.....	20 ordered out of town.
1	Disturbing peace.....	1 jail sentence.
Total arrested, 95; total punished, 26.		
Grand total arrested, 247; grand total punished, 104.		

EXISTING LAWS REGARDING TRESPASSING.

The continuance of chronic trespassing and of the chronic slaughtering due to it are mainly due, as has been said, to the fact that in most states and municipalities the laws do not specifically prohibit trespassing on railway property, or that they are not enforced. In most of the states there are statutes prohibiting tampering with switches, placing obstructions on the tracks, stealing rides on trains, etc.; but the great need is legislation specifically prohibiting trespassing in any form.

Although the risk involved in ordinary trespassing, and its results in many forms of criminality and in the killing of 5,000 people a year, are well known, in a large majority of states there are no specific statutes dealing with the subject. There are enough of them, however, to show that where intelligent consideration has been given to the matter the need for such legislation has been appreciated. In New York all persons, except those connected with or employed upon a railroad, are prohibited from walking upon or

along its tracks, except where they are laid across or along streets or highways. In Wisconsin it is declared to be unlawful for any person, except an employe, to walk along railway tracks, unless they are laid along public roads or streets, but no penalty is provided for violating the statute. In Virginia persons are prohibited from being on a track within one hundred yards of an approaching train otherwise than in passing over the railway at a public or private crossing. In Missouri it is provided that any person who is injured while walking without right on a railway track shall be deemed to have committed a trespass in any action brought by him on account of such injury, but the courts of Missouri have practically nullified this statute and there is no specific prohibition of mere trespassing. In Indiana any person who is unlawfully on, or is about to unlawfully enter on, the property of a railway, shall be notified to depart by the company's agent, and if he shall refuse to do so, shall be guilty of a misdemeanor and on conviction shall forfeit not less than \$5 nor more than \$50. This law is very defective because of the provision that notice must be given to the person before his trespassing can be punished.

In New Hampshire it is provided that "if any person shall without right enter upon or remain in any right-of-way, track, yard, station ground, bridge, depot or other building of any railway when notice has been posted forbidding such trespassing, he may be fined not exceeding \$20, and no right to enter or be upon any railroad track shall be implied from custom or use, however long continued." It is further provided that if any person shall be injured while violating this act, neither he nor his executors or administrators shall have any cause of action against the railroad company for damages arising from such injury unless the injury is occasioned by the willful or gross negligence of the railroad or its employes. In Maine it is provided that no railroad corporation shall be liable for the death of a person walking or being on its road contrary to the law or to its valid rules and regulations. It is further provided that whoever without right trespasses on a railway track or other property shall forfeit not less than \$5 nor more than \$20. Railways are required to keep the section containing this latter provision posted in a conspicuous place in every passenger station, and for neglect thereof may be fined \$100. The New Jersey law prohibits any person but an employe from walking along tracks except when they are laid on a public highway; and any person who is injured while violating

this provision cannot recover damages. Massachusetts provides that whoever without right knowingly stands or walks on a railroad track shall forfeit not less than \$5 nor more than \$50, and the Rhode Island law is similar.

THE SITUATION A STRIKING COMMENTARY ON GOVERNMENT
REGULATION.

The foregoing summarizes the provisions of all the state laws that can be found that deal with the specific subject of railway trespassing. Furthermore, the laws already existing are not enforced as the conditions demand. It is a striking commentary on the policy of regulation of railways heretofore followed that numerous legislatures have passed laws regulating the hours of service of railway employes, fixing the number of men that there must be in train crews, requiring high power headlights, providing for inspection of locomotive boilers, etc., all of which provisions together are adapted to prevent only an extremely small part of the fatal railway accidents, while in only a very small number of states have there been passed laws to remove the cause of over 50 per cent of all fatalities on railways.

Congress has passed several laws to promote safety on railways, and it has been suggested that it should legislate regarding trespassing. Any authority Congress has over the subject must be derived from the constitutional provision empowering it to regulate interstate commerce. Lawyers who have considered the subject differ as to the power of Congress in the premises. Some doubt if a federal trespassing law would be valid; others question if it would be desirable; others believe that it would be a constitutional and wholesome regulation of interstate commerce.

The consensus of legal opinion is that the matter should be dealt with by the states in the first instance, at least. There is no doubt as to the power, and it would seem there can be no question as to the duty of the state legislators to act. A very short and simple statute, if properly enforced, would be adequate. Such a statute should make it unlawful for any person to trespass on any railway track, right-of-way or station grounds, or to trespass by getting on or off, or riding on any railway train, car, or engine; and would provide for fines or imprisonment, or both, for every offense.

FOURTEEN KILLED DAILY—AND NOTHING DONE!

Fourteen people were killed yesterday while trespassing; fourteen will be killed today; fourteen will be killed tomorrow—if the record

of recent years is being and shall be maintained. It is not often that as many as fourteen passengers are killed in a wreck; but every bad wreck causes numerous investigations and reports, often resulting in orders by commissions or legislation. The greatest number of passengers ever killed in a single year from all causes was in 1907, when they numbered 610; and even in that year the number of trespassers killed, 5,612—was over nine times as great as the number of passengers killed. In 1911, the last year for which we have complete statistics, the number of passengers killed was only 356, and the number of trespassers killed 5,284, or fifteen times as great. And yet newspapers agitate, commissions issue orders and lawmakers legislate to reduce accidents to passengers, and almost no one in a position of public authority does anything to reduce the slaughter of trespassers. The number of employes killed on railways is vastly too great, but it is not nearly as large as the number of trespassers killed. During the last ten years the number of employes killed has been about 33,000 and the number of trespassers killed has been about 52,000. And yet, while lawmakers bow before the legislative representatives of the railway brotherhoods and pass almost any kind of legislation for which they ask, whether really in the interest of safety or not, they do almost nothing to stop the killing of trespassers.

There will be forty-one legislatures in session this winter. Isn't it about time that they should do something about this great American crime of railway trespassing with its terrible results? And after the legislatures have acted—if they do—what are other public officials going to do about the matter?

TRESPASSERS KILLED ON RAILWAYS—WHO ARE THEY?

BY FRANK V. WHITING, GENERAL CLAIMS ATTORNEY, NEW YORK
CENTRAL LINES.

A most enlightening study of the problem of trespassing on railways is presented on another page by Frank V. Whiting, general claims attorney of the New York Central Lines. Out of 10,396 persons killed on our railways during the fiscal year 1911, 5,284 met death while trespassing on railway property; and of these, 4,125 were reported as having been struck by engines or cars, which means that they were walking or standing on the tracks. It has been commonly assumed that most of the trespassers killed are tramps or "hoboes," and even railway men will be surprised at the facts given by Mr. Whiting. From an examination of the reports of accidents resulting in the deaths of 1,000 trespassers, he concludes that the great majority are not of the class of aimless wanderers who might be expected to be careless of their lives, but are business or professional men, regularly employed workingmen, and members of their families, whose deaths are a distinct loss to the community. Most of them are people living or working near the railway tracks. Mr. Whiting's figures should be of special significance to lawmakers and local authorities whom the railways have long tried, with little or no success, to interest in the passage of stringent legislation against trespassing or in the enforcement of existing laws. Undoubtedly public authorities have excused to themselves their failure to take steps to keep off railway tracks people who have no business there, on the theory that a majority of those killed are of a kind whose loss is of little consequence, or even a good riddance to the community. Others have been so intent on condemning and regulating the railways, because of the less numerous but more spectacular classes of casualties caused by train or crossing accidents, that they have neglected the much more numerous casualties due to trespassing. Mr. Whiting's demonstration that most of the people killed while trespassing are of a class that is in every way comparable with the passengers and employes killed in train accidents ought to lead to more intelligent coöperation on the part of public officials with the efforts of the railways to reduce this kind of fatalities, which can only be re-

duced by the passage and enforcement of proper laws.—Editorial *Railway Age Gazette*, March 8, 1912.

Recent writers have stated that probably there are no fewer than 500,000 tramps in America. When we realize that they arrive at this number by taking as a basis the number of trespassers on railways killed, and multiply this by the figure representing the proportion of trainmen killed in a year to the total number of trainmen employed, we see how unreliable such figures are. As a matter of fact, trespassers come from all walks of life, and the statement that was recently made by Orlando F. Lewis, that from one-half to three-quarters of trespassers are vagrants, is without foundation. Mrs. Alice Willard Solenberger, in a book recently published by the Russell Sage Foundation, entitled "One Thousand Homeless Men," criticises the custom of railway officials in designating as "tramps" that very large body of men that "beat" their way about the country, and she refers to thousands of bona fide workmen who, at certain seasons of the year, are needed in a particular section of the country in large numbers. She states that these seasonal and shifting workmen are not tramps and should not be classed as such; and neither should other men, who with a legitimate purpose are on their way to a known destination; nor should those others who are only accidentally or quite temporarily upon the railways be so classed. She further states that to class these men as "tramps" is not only unfair to the men, but confuses the discussion regarding either homeless men or tramps. From her investigation she decided that 220 out of 1,000, or less than twenty-five per cent, were tramps.

Being impressed with the lack of information on the subject, and also by the assertions made with regard to tramps on railways, I deemed it profitable to secure some authoritative data, and to this end have examined reports of accidents resulting in the deaths of one thousand trespassers. The results are interesting as well as enlightening.

It is many years since the word "tramp" escaped from the vocabulary of most railway officials, and was superseded by that very sentient substitute, "hobo." A tramp means one who walks from place to place, either idly or in search of work; specifically, "an idle wanderer." "Hobo" is defined as an idle, shiftless, wandering workman, ranking scarcely above a tramp.

Among most railway men the hobo is a typical tramp, especially to those who come in contact with the trespasser problem through the investigation of accidents resulting in injury or death of persons generally. However, neither the word "tramp" nor "hobo" is used, except in a very restricted sense, when applied to some person who is in fact a hobo or tramp. These words, however, are not used to designate that large class of persons who walk upon the tracks or "beat" their way upon railway trains, but such persons have for years been classed as trespassers.

The Interstate Commerce Commission reported that during the fiscal year ending June 30, 1911, 10,396 persons were killed upon railways, and this number includes those who were instantly killed or died within twenty-four hours from the time of accident. Of these, 5,284 are designated as "trespassers." It is a significant fact that, of the number of trespassers killed, practically eighty per cent, or 4,125, are shown as having been "struck by engine or car," in other words, were walking or standing upon the tracks; 520 were killed in "getting on or off cars and engines," 1,043 "while on trains," and 116 from "other causes."

There are many trespassers on the tracks of railways who are regularly employed and who make it a practice to use the right-of-way between streets or highways in going to or from their work. The tracks are also used to a considerable extent by pedestrians when public highways are wet and muddy, or difficult to walk upon.

We found that of 1,000 persons killed while trespassing, 489 resided near the place of accident; 321 resided at a place distant from where the accident occurred; and the residence of the balance, 190, was not ascertained.

The conjugal state of the decedents has some bearing upon this question; and it is interesting to note that of these trespassers, 273 left widows or children, 33 were widowers, 376 single, and the family connection of 318 unknown. Further, 369 were living with their families or parents, 301 were not living with their families or parents, and 330 could not be classified in this respect. When we consider that many young men employed in our larger cities have left home and are boarding, and that among the trespassers there is quite a number of foreigners who come to this country without their families, it is not strange that so large a percentage should be found not living with their families or parents. Another thing that indicates clearly that the large majority of trespassers are not tramps in any

sense of the word, is that 598 of the thousand referred to were self-supporting (388 were known to be regularly employed), and 105 were not self-supporting. This information was not obtainable as to the balance.

The ages by groups are of interest: 68 were 15 years and under; 340 were 16 to 30 years old; 451 were 31 to 60 years old; 69 were over 60 years old; 72 were of unknown ages, all these being adults.

With reference to nationalities we found that 468 were Americans, including 3 Indians and 18 negroes. In 174 cases the nationality was not reported, but in the rest we find that no less than twenty-four foreign countries contributed their quota to this regiment of trespassers who trespass no longer.

The occupations of those killed and the number employed in each warrants detailed mention. These were as follows:

349 Unknown.	2 Barbers.
19 None.	1 Contractor.
70 School children and students.	3 Bakers.
268 Laborers.	2 Messengers.
44 Farmhands.	5 Soldiers.
1 Minister.	8 Sailors.
1 Actor.	31 Railway trainmen and other
1 Inmate asylum.	employees.
10 Engineers.	3 Musicians.
1 Chemist.	1 Teacher.
4 Clerks.	2 Fishermen.
6 Hotelmen and bartenders.	1 Patrolman.
18 Merchants, salesmen and agents.	2 Shoemakers.
2 Coachmen and chauffeurs.	4 Horsedealers.
3 Linemen.	4 Lumbermen.
3 Cigarmakers.	3 Watchmen.
3 Nurserymen.	8 Miners.
81 Shopmen and mechanics.	

Then, there were in addition six small children and thirty women.

It is thus readily seen that not only from more or less actual knowledge, but by a definite process of elimination we learn that many of these unfortunates were neither tramps nor hoboes, and, in fact, we are justified in saying positively that 764 were not hoboes and 50 were, and that the status of the rest was not determinable.

Deaths are occasionally brought about by intention on the part of the decedents, and the information at hand shows that 15 of the cases were reported as suicides. Intoxication contributed to a large extent to the number of deaths, there being 93 cases reported due to this cause; at least the men killed were intoxicated at the time. In 708 cases the trespassers were not intoxicated, and in the rest the condition in this respect was not known.

Mrs. Solenberger says: "It is the mere accessibility of the railways more than anything else, I believe, that is manufacturing tramps today. So long as it is possible for practically any man or boy to beat his way about the country on the railways, we shall continue to have tramps in America. When we succeed in absolutely closing these highways to any but persons having a legitimate right to be upon them, we shall check at its source the largest single contributory cause of vagrancy, and the problem of the tramp, as such, will practically be solved. As an unemployed, untrained, sick or irresponsible homeless man he will still need attention, but this can be given him with incomparably less difficulty when once he is deprived of the facilities he now has for wandering from one place to another."

Considerable has been said of late with reference to laws against trespassing. Very few of the states have laws specifically directed against trespassing on railway tracks, and usually laws with reference to trespassing on trains are mild in form and not very often enforced. A great deal of difficulty has been experienced from time to time in getting magistrates to prosecute offenders in this respect.

Mrs. Solenberger suggests: "If the migration of tramps could be controlled, as already suggested, under some sort of federal interstate commerce law, the problems might perhaps be solved, but it is most unlikely that these vagrants can be dealt with by the national government until long after individual states have discovered how best to deal with them locally. Students of the problem now generally believe that little progress can be made by any state until the responsibility for the treatment of the tramp is assumed by the state as a whole; until the laws which affect him are state laws; until the cost of his arrest and punishment or treatment is met by the state, and not by counties or cities within the state."

It has been suggested from another source that Congress pass a law prohibiting trespassing on interstate railways; and this suggestion is an excellent one and should receive serious consideration.

However, it is evident from the information shown above that, after all, the problem is not so much one of dealing with tramps or hoboes, but with trespassers, who in many instances are regularly employed, well-to-do and respected citizens of our towns and cities, and that so far as the prevention of accidents to trespassers is concerned, the problem is largely a local one and wholly within the hands of the local authorities.

RAILWAY NATIONALIZATION

ADDRESS BY MR. F. H. DENT, GENERAL MANAGER OF THE SOUTH-EASTERN & CHATHAM RAILWAY, BEFORE THE RAILWAY STUDENTS' ASSOCIATION, AT THE LONDON SCHOOL OF ECONOMICS¹.

Mr. Dent began by thanking the members for the honor they had done him in electing him as their president. He wished, he said, to give a few impressions of a subject of vast importance to them and of almost as great importance to the state—he referred to the state acquisition of railways. There was no doubt that the demand for the state ownership of railways was now very much more insistent than formerly. As they were aware, there was an immense mass of literature already on the subject, and no doubt their opinion of most of this literature was the same as his own—the artist always overcolored his picture. If a writer was in favor of railway nationalization he would have everyone believe that under state-owned railways rates would be lower, wages higher, hours shorter, and profits larger. If, however, he should not be in favor of nationalization, he generally drew a picture of chaos. One writer would give as an illustration the Prussian State Railways, whilst the other would point to a partial experiment in a nearer country; but each overcolored his picture. It was quite true that the Prussian State Railways were well managed, but it was also quite wrong to suppose that there were no complaints. Complaints would always arise; if none were forthcoming they might be sure that the railways were run very extravagantly. He thought they might discount one-half of what they read in this connection, and he was sure that if the railways of this country were nationalized there would as a result be nothing extreme—there would be no chaos and no millennium.

THE FOUR SYSTEMS.

Broadly speaking, there were four systems worth considering. First, there were the state-owned railways, of which Prussia was the best example; secondly there was the French system of control which almost eliminated competition while protecting the investor

¹ Reported by the *Railway Gazette*, October 25, 1912.

and the trader—an excellent system in his opinion, but one which it was too late for this country to adopt; thirdly, there was the American method of encouraging private enterprise by huge subsidies, not in money but in the form of land; and, fourthly, the British system, which allowed anyone to build a railway who could show that he had sufficient money for the purpose, and that the line was physically practicable, but giving him no assistance of any kind. His own view was that Great Britain would have been wiser to have adopted either the Prussian or the French system in the earlier days of railways, but there was no doubt that we, as a nation, attached a great value to competition. Personally, he thought this was a great mistake. Where competition had obtained they usually found that railways had a lot of leeway to make up. However, the nation, through its Parliament, encouraged competition, and so the nation must take the responsibility of its encouragement, one result of which was the price it must pay for its railways.

THE PURCHASE PRICE.

As regards price, some writers who proposed nationalization were apparently afraid that cutting rates in half, raising wages and shortening hours wholesale might result in a deficit, and hinted or even suggested that the state should not keep its word and pay the price fixed or indicated by the Act of 1844. If they took the capital per route-mile of British railways it seemed extraordinarily high when compared with, say, the capital of American railways or the price paid by Prussia, but they must remember that they were not comparing like with like. They should really compare track-mileage including sidings, and also the number of stations. They must also remember that British railways were, with insignificant exceptions, not subsidized in any way: on the contrary, Parliament provided that the railways must pay more than the actual value for the property they had to take, and apart from that the property when taken was more valuable by far than in Prussia or America. Let them take the average roadside station in this country and compare it with one in any other country, and they would see at once that an enormous amount of extra capital had been sunk in ours owing to Board of Trade requirements. Again, Parliament had decided that it was in the public interest that railway routes between places should be multiplied where one route could have carried all the traffic. All this extra capital expense was encouraged by the na-

tion's representatives, and consequently it was not unreasonable that the nation should foot the bill.

"NOMINAL" CAPITAL.

It had been suggested by certain writers that the fact that certain railways made nominal additions to their capital was a reason for reducing the amount payable by the state. He could not follow that reasoning, as the price to be paid was based on the profits and not on the capital. But in passing he noticed that these writers when referring to watered capital invariably forgot to mention that much of the nominal capital represented a far greater sum actually expended. A great deal of stock had been issued at a premium—that was, more money had been received when it was issued than the nominal value of the stock, so that £100 of nominal capital often represented a larger sum actually expended. Taking them altogether, he was sure the railways of this country were not over-capitalized—he meant that the nominal capital in total represented a smaller sum than had actually been expended in legitimate capital expenditure. Certainly all capital had not been wisely expended. The traffic to and from the counties of Sussex, Surrey and Kent, even with the continental traffic added, ought not to require a tunnel under the Thames and five bridges over it, four of the latter each carrying several lines of rails; but the fact remained that the Legislature encouraged the expenditure, and even encouraged further expenditure, which, fortunately, did not materialize.

GOVERNMENT STOCK.

Proceeding, the speaker said that it was alleged by some opponents of railway nationalization that the financial transaction was too great even for a wealthy country like ours. He laid claim to no skill in high finance, but it certainly seemed to him that if the debt of the nation would be enormously increased, after all the nation would be getting value in return. He assumed that the method of payment would be by the government undertaking the railway debentures and issuing a national stock to the shareholders in exchange for their shares according to the ascertained value.

PARTIAL PURCHASE UNSATISFACTORY.

It had, he believed, been suggested that the state should try an experiment by taking over the Scottish or the Irish lines. Personally, he failed to see the need for any such experiment. If Prussia could

work its railways satisfactorily surely Great Britain could do the same.

There were many objections to a partial purchase. One great advantage of nationalization would be the abolition of accounting and settlements between companies. These would continue if only a portion of the whole railway system were taken over. Another objection was that the advantage of a single rolling stock would be lost. Yet another was that the state management would receive even less fair play from critics than our present railways received, and every little failure would be held up as an instance of state mismanagement.

THE QUESTION OF POLITICS.

If the railways were taken over by the state what systems were they to be worked on? He had not the least doubt that the system of administration to copy was the one that had proved so successful, and that was the Prussian system. He had not the least doubt, however, that politicians would not be content to have a system so little dependent on Parliament as the Prussian system was, but he was quite sure that as a result our State railways would be less economically and efficiently managed. One had only to look at what had happened in neighboring countries to realize that sound economics would often be sacrificed to the exigencies of party politics. He did not suppose that this would be carried too far, if the whole of our railways were nationalized. There would, of course, be a very large body of state servants with votes, and it might be feared that if united they might obtain a practical control of Parliament and in their own interests reduce the railways to a non-paying condition. But the magnitude of the danger would, he thought, secure us from such a result. If the state servants were unreasonable in their use of political power, they would rally against them the majority of the nation to such an extent that it would not pay any political party to court their support. The danger would, he thought, be greater with a partial purchase.

NO MILLENNIUM—NO CHAOS.

Turning to the probable result of nationalization, the speaker said he thought it would prove a disappointment to those who expected either a great net income to the state, a drastic reduction of rates and fares, a great increase of wages, or general chaos. It might be assumed that the large number of officers now engaged in man-

aging and operating railways were of about the average ability. Under state control he saw no reason to suppose that any more or less than the average ability would be shown. It was possible that there would be a greater difficulty in rising from the ranks, but on the whole the average ability would not vary much. Where the state railway officer would gain would be in the cessation of questions arising out of the conflicting interests of railway companies; he would not have to be constantly resisting demands of public or Parliament. On the other hand, his time would be taken up to a greater extent in explanations and reports to the dignitary next above him. On the whole he would have more time to devote to the real business of a railway manager or superintendent, i. e., the operation of traffic.

OFFICERS AND STAFF.

Secondly, it was suggested that there would be a reduction in the number of staff employed. Undoubtedly there should be in one direction. There was no doubt that State Railways would not directly employ the staff now necessary for cartage; they would probably let the hotels. Certainly some of the construction shops would be closed, and the parcels traffic would probably be turned over to the Post Office. All these alterations would reduce staff, and, by the way, would also reduce receipts. Another saving of staff might occur, and he would defer mentioning it until he touched on the question of rates. Many writers suggested a great reduction in the number of well-paid posts. One gentleman lately said there were 250 general managers in this country, while under the state only one would be required. He (the speaker) did not suppose there would be even one, but it was ridiculous to suggest that these 250 posts would not be replaced by at least 250 others at, at least, the same average salary.

It was quite true that on many railways salaries were paid to one or two officers which were in excess of anything the government need pay, but that was done usually under stress of competition from abroad—in fact, for commercial reasons.

No doubt the "Stationmaster-General" or whatever the minister in charge was called, would require a vast amount of detailed information elaborately summarized, and this would mean a great increase in the accountant's staff which would in cost outweigh the saving made by getting rid of the settlements between companies

now existing. On the whole he thought there would not be a great saving in cost of staff in offices except where it would be balanced by a loss of receipts.

On the other hand, there would be a considerable saving in the working staff. There would be some saving in canvassers, but even under a state railway system it would be necessary to have officers in the commercial department. He knew of a case where competition between two railways ceasing, the canvassing staff was put to other work, but it was found that the goods manager was getting out of touch with the traders, and the canvassers were restored. The trader would no longer be allowed a choice of route for his traffic. This would allow of more fully loaded through freight trains, which were the cheapest to work. With the choice of routes the state official would be able to manipulate his time table so as to leave, on certain lines, larger intervals for moving freight traffic. A saving in shunting should be made at existing points of exchange by more through working. It would be interesting to see whether the state would fall into line with other countries and refuse to pay a staff for handling passengers' luggage, where it was conveyed free of charge.

PRIVATE OWNERS' WAGONS.

Having one rolling stock would be a great economy, and greater still would be the extinction, which must be gradual, of the private owners' wagons. He was certain it would not be long before the state authority would realize what a terrible handicap the railways suffered under the present law, and the practice which grew up under that law. In police, in legal expenses, in telegraph maintenance there ought to be savings. There would be some saving in advertising, but judging by other state railways there would still have to be a certain amount. He supposed that the state would also see that rates and taxes would at least not increase.

PAY AND HOURS OF DUTY.

On the subject of pay and hours of duty he would only say this—that when the state realized the exact nature of the duties that the outdoor staff performed, the amount of work done as compared with that of other classes of the laboring population, the anxiety for employment on a railway and all the other conditions good or bad, then the state official responsible would be able to make a good case for increasing much or little or not at all the pay of the em-

ployes. He would also realize the exact cost, and the nation would know what it could afford.

RATES AND FARES.

As to rates and fares, he had no doubt that it would be found that the average price paid per mile for passengers traveling in this country would be as low as could reasonably be expected and compared well with other countries. What would happen was that the state would terminate the practice of diverting passengers from one pleasure resort to another on a different line by charging relatively lower fares. It was sound commercially, under present conditions, but the conditions would be changed and fares would be on a uniform mileage basis. He did not mean that the state would discourage cheap traveling by abolishing excursion fares, but they would be applied only when it was to the benefit of the state railways as a whole.

The most difficult question would be freight rates. They saw it stated constantly that the average rate per ton per mile was higher in this country than in others. He did not know how this information was arrived at, but it was probably correct as a general proposition. Now let them suppose that traffic was carried at the same rates and under similar conditions as at present, as for a time it must be. There could, of course, be no objection under state management to the publication of the ton-mileage figures so hungered for by many economists. Supposing that the result was that their average rate per ton per mile was 10 or 20 or 50 per cent higher than Prussia. That was not going to result in an immediate reduction of rates by 10 or 20 or 50 per cent. The railway administration would immediately say that owing to geographical reasons their average haul was exceptionally short. Well, an allowance could be agreed on for that, and they would suppose the result was again unsatisfactory, from the traders' point of view. The administration would still say, "Under the system we have inherited, a much larger proportion of our freight is urgent traffic, which in other countries is not sent by freight train and as that increases our average rate per ton per mile, naturally such traffic pays a comparatively high rate per ton per mile." Well, a comparison could no doubt be made here also by separating into commodity statistics, but then again they could be met by the greater terminal facilities offered. He excluded cartage because all rates would no doubt be

converted, at great expense for clerical labor, to a station to station basis. It would not be easy to compare the costs of terminal facilities, because they could not expect another nation to prepare statistics for their benefit. They knew that the costs were far greater here than in other countries, although even here they were not so great as one gentleman would have them believe. He referred to the enthusiastic inventor who suggested that he would do the greater part of the terminal and exchange work in London, reduce the cost to the railways and to the traders, and make a profit—not receipts, but profit equal to about half the total receipts for merchandise of all the trunk lines which ran into London.

Continuing, the speaker said the fact was that the freight business in this country was different from that of other countries. It had progressed on different lines. Competition had been in service and not in rates. The freight service was a more expensive one owing to the higher speed. They all knew the critic who said that because a certain consignment took a certain long time to reach its destination the freight service of this country was slow. On a certain railway, one of the largest freight carrying lines, a record was taken to ascertain how long it took the wagons loaded and despatched on a certain day to reach their destination and be unloaded. The vast majority arrived the next morning, nearly all the rest the next day but one, and an insignificant percentage took longer. He was in a position to know to some extent what the relative despatch was in other countries, and he knew that our railways gave faster, and therefore more expensive, transit to freight traffic. The amount of the average rate per ton per mile on coal traffic was no measure of the fair rate to be charged. House coal traffic, for instance, was as a rule much more expensive to work than shipment coal traffic.

CHANGE OF SYSTEM.

It was quite impossible for our railways under present conditions to alter the system to any extent. Trade had grown up under that system, and any change would be most difficult. Another great difficulty was that it would in many cases alter the proportions of traffic carried to the detriment of certain railways. But under a state system it was possible to do it, and he thought that a state system in time would gradually bring itself into line with those of other countries. It would drop out of the carriers' business and

deal in wagon loads; the small consignments which were relatively so costly to handle would be turned over to forwarding agents, and freight trains would run at more economical speeds, and therefore with bigger loads. There were many services other than haulage that had to be rendered by railways for which the charge was included in the rate, and he was convinced that many of those services were not worth to the trader their cost to the railway.

The result of the change would be, of course, a decrease of receipts, but this would be off-set to some extent by a decrease in working costs, a decrease in employment mainly of the lower paid grades, with a consequent increase in the average rate of pay, and a decrease in the rate of receipts per ton per mile; a very useful result to the advocates of state ownership, particularly when the causes were forgotten.

There were many other points of interest—too many for him to touch on that occasion. He would mention one. He could not conceive state railways allowing credit as the railways did today. He was not advocating state purchase. It was not, he thought, for a railway official to advocate it or otherwise; he only thought it must come. He would conclude by saying a word for the proprietors of the railway companies. They had invested their money in the railways, encouraged so to do by the state. The only service the state had done them was to allow them to compulsorily purchase property at more than its value. They had come under very heavy obligations, they had rendered a very great national service—he thought greater than any other investors—they had received a much poorer return than if they had invested their money in the provision of any other necessary articles, such as the supply of food, chemicals or soap, for instance—and it would be monstrous if they were treated unjustly by the state when the state wished to take over their property. One word more. The question of state purchase would, he thought, become more and more insistent. In this country at any rate the tendency was for writers on the subject to take sides and to indulge in personalities. He urged the student when reading up the subject to keep his judicial faculty alive, and to look with suspicion on quotations from well-known experts. Personally, he did not know what was meant by the word expert as used by writers. A man could not be a railway expert unless he had had a railway training. In their reading he begged of them always to have the salt-cellar at hand.

AUSTRALIAN RAILWAYS.¹

BY THE HON. J. G. JENKINS.

After I consented to read a paper on Australian Railways, one of my friends said to me: "Why in the world did you choose such a subject? You must have known that it was dry and unattractive, and would be most uninteresting to anyone who would be foolish enough to go and listen to you." Buoyed up by such encouragement, I decided to continue the paper. There are three reasons why I have selected this subject, dull and dry though it be. In the first place, it is a subject in which I have for many years taken a special interest, partly by choice and partly by compulsion, as I was for nearly 20 years interested in every railway proposal or bill which was brought before one of the Australian Parliaments, and was for over six years the Ministerial head of the railway department. In the second place, my experience during several years in this country has on many occasions convinced me that there is a great lack of knowledge by the general public in respect to the relations between the indebtedness of Australia and its public undertakings, such as railways, wharves, waterworks, etc., and the third reason is that the energetic secretary considered the subject a good one, and his judgment and experience are beyond dispute.

AREA AND POPULATION.

In dealing with Australian railways, it may be necessary to refer for a moment to the country's location, extent, physical features, and climatic conditions. We have a continent island, lying at the other end of the world, over 10,000 miles from the kingdom from which 95 per cent. of its population has descended; having an area of about three million square miles and a coast line of over 12,000 miles, with for the most part a fringe of hills or low mountains not far from the coast, with vast plains and tablelands broken by occasional hills in its expansive interior, with a variety of climate, tropical, semi-tropical, and temperate, a rainfall varying according to locality from five to nearly 200 in., rich soil, and glorious sunshine. Such, in brief, is Australia, with a population of $4\frac{1}{2}$ millions of peo-

¹ Paper read before the Colonial Section of the Royal Society of Arts on Tuesday, May 21, 1912.

ple, or only one and a half for every square mile of land, while here in the United Kingdom we have 366 for every square mile. These are facts which have to be noted when dealing with a country's railways.

CONSTRUCTION OF FIRST RAILWAY.

The first railway was started in New South Wales in 1850 by a private company, but the discovery of gold in different parts of Australia about this time caused a general rush of nearly every able-bodied man to the goldfields, so the private company was not able to complete its railway. The same thing happened with one or two private companies in Victoria about the same time, and in both colonies appeals were made to the authorities, and the lines were taken over and completed by the respective governments, so it is more than likely that the State-owned railways of Australia are the result of the gold discoveries, for from these early experiences other lines were proposed and constructed by the governments of the different states, and the national system has grown up with the population. A few private lines have been built, but they have mostly been purchased by the governments. So, in speaking of Australian railways, it is generally understood that one means government-owned lines.

SLOW GROWTH AND COST.

For many years the railway growth was very slow. In 1855, five years after the commencement of the first line, there were only 23 miles in all Australia, and during the next 16 years, up to 1871, there were only 220 miles more added. From 1871 to 1891, however, 9,000 miles were constructed, and each year since has added to the mileage, until on June 30 last year there were about 17,000 miles of government railways, which had cost about £155,000,000, or an average of a little over £9,000 per mile. When this is compared with the great expense of railway construction in this country (United Kingdom), it is easy to see that the money spent on railways in Australia is bound to earn a good return as population and settlement increase. Some of the Australian lines have been rather expensive, the dearest one being from Melbourne to Bendigo, 100 miles, which was built just 50 years ago at a cost of £48,000 per mile. On the other hand, many lines have been built in the different states at less than £2,000 per mile, and I believe one or two lines in Western Australia have only cost about £1,000 per mile. These cheap lines have been the means of opening up and

developing large tracts of country which would otherwise have remained unoccupied. The money for the construction of the railways has been mostly raised by loan in this country, each particular state dealing with its own lines and becoming responsible for the money borrowed.

NEGOTIATIONS FOR CONTROL.

On several occasions since the establishment of the Commonwealth Government, negotiations and discussions have taken place between the Federal Government and the states to see if arrangements could be made for the state loans to be taken over by the Federal Government, giving that government the receipts from the railways, and in a sense a kind of general control. So far no successful basis has been arrived at, and until the Federal authorities become more national and practical, and less sectional and political, it is considered that the states will act wisely to retain the responsibility and the control. A mutual understanding has existed for years between the Railway Commissioners of the different states, and the most harmonious relations prevail.

DETAILS OF EACH STATE.

The mileage, cost, and earnings of the railways in each state are of special interest, more particularly to those who are holders of Australian bonds. New South Wales has 3,760 miles of government railways, which have cost £51,000,000, or an average of £13,550 per mile. The gross earnings last year were £6,042,000, and after paying working expenses and full interest on capital, there was a surplus to pay into the State Treasury of £554,000. This was not an exceptional year for during the six years ending June 30, 1911, there was a net surplus of over £3,000,000. In Victoria there are 3,528 miles of railways, which have cost £44,200,000, or an average of £12,500 per mile. The gross earnings for the year ending June 30, 1911, were £4,900,000, and after paying working expenses, interest on capital, and over £100,000 for pensions and gratuities, they had a net profit of £283,000, and for the six years ending June 30, 1911, they had a net surplus of over £900,000. South Australia has 1,457 miles of railways, which have cost £12,680,000 or an average of £8,700 per mile. The net surplus last year was £312,000, and for the last six years it was £1,388,000. Queensland has 4,248 miles of railways, the most of any one state; they have cost £27,300,000 or an average of £6,425 per mile. Total revenue

for year ending June 30, 1911, £2,882,000; net surplus, after working expenses and interest, £163,500; net surplus for the previous year, £218,000. For some years previous the returns had not been sufficient to pay full interest after working expenses. Western Australia constructed its first railway in 1879, for the development of the copper mines in the Northampton district; since that time the discovery of rich mineral fields has been a great impetus to railway construction. Up to June 30, 1911, there were 2,633 miles of government railways open for traffic; they had cost £12,000,000, or about £5,000 per mile, being the cheapest in any of the states. The gross revenue for the year was £1,844,000, after paying working expenses and interest on capital, leaving a net surplus of £224,500, and for the six years ending June 30, 1911, £884,000. Tasmania has 463 miles of railways, which have cost £4,000,000, or an average of £8,650 per mile. Tasmania is the only state that has not in recent years been earning a net surplus over and above working expenses and interest on expenditure, but her losses have been small in comparison with the profits in the other states, and the prospects of further traffic over the railways there are encouraging. The railway manager in his last report says:

"At the time of writing there is great activity on the west coast lines consequent on the resumption of work at the Zeehan smelters, and there is also a marked improvement in the traffic on the western and main lines. Reports from all districts are very encouraging as to the coming harvest, and I confidently anticipate a large increase in revenue for the current year." Taking the railways in the Commonwealth as a whole, the net surplus over working expenses and interest on capital for the last six years has been over £4,200,000. It seems, therefore, that there need be no doubt about the safety of the money lent to Australia for railway construction.

AUSTRALIA'S DEBT.

When Australia's indebtedness is referred to as so much per head of the population, without explanation, it looks as if it was a debt-ridden country; but when it is explained that out of the entire indebtedness of between 250 and 260 million pounds, 25 per cent of it is lent by its own people, whose knowledge of the security is first hand, and that 155 million has been spent on railways which have paid back to the revenue in surplus profit an amount of over £700,000 each year for the last six, the national debt appears

in a different light. Besides this, wharves, waterworks, electric tramways, and other public undertakings are returning a fair rate of interest and increasing in value each year. While referring to assets, it might not be out of place to mention, without dealing with the immense wealth of pastoral, agricultural, manufacturing and mining industries, that the people have sufficient money deposited in the savings and other banks to pay off the entire cost of the railways, and still have about 20 million pounds to spare for holiday and travelling expenses.

RAILWAY ADMINISTRATION.

The Australian states have adopted a somewhat uniform system so far as the administration of their railways is concerned. Prior to 1888, New South Wales railways were vested in the Minister for Works; in that year an Act was passed to place the control under Railway Commissioners, in order to free them from political influence. Three commissioners were appointed, but the triple-headed control did not prove altogether satisfactory, so one Chief commissioner was appointed under an amended Act of 1906. In Victoria, even at an early date, the necessity for removing the control from political influence was felt, and in 1883 Commissioners were appointed by Act. In Queensland the same course was followed in 1888, and in the same year South Australia adopted the same system. Western Australia in 1902 followed the example of the eastern states, and placed its railways under the control of a commissioner. In Tasmania, where the government railways are not extensive, the control is still chiefly vested in a Minister, but the maintenance and management is placed in the hands of a general manager, who is subject to ministerial directions.

No one can doubt the wisdom of placing the control and management of the railways under commissioners instead of allowing them to remain under political control. Of course, railway matters are still discussed in Parliament, for no line can be constructed without an Act authorizing it; money can be voted only by Parliament, and important regulations and alterations of rates have to be laid on the table of the House for a time before they become effective. All this gives members who represent railway districts ample opportunity of mentioning real or supposed grievances, and generally talking to their constituents at the public expense, an art not unknown even at Westminster.

CONSTRUCTION.

Time will not permit of my dealing with the engineering and other difficulties in the construction of the railways. From what was previously stated that a fringe of hills or mountains in many places separated the coast from the interior, it will be seen that much expense and skillful engineering were necessary for the construction of many of the lines. Special mention might be made of those leading out of Sydney, west over the Blue Mountains, north over the Hawkesbury River, and south through the Bulli Pass. The Toowoomba line in South Queensland, and the Cairns line in the north, were by no means easy to construct; neither was the line leading through the hills from Adelaide towards Melbourne. Of course, there are no curves on the Australian lines so sharp as they are supposed to be on American tracks, where the brakeman on the back car is said to be able, while going around the curve, to light his pipe from the engine-driver's fire. Some of the Australian curves are sharp enough, however, to occasionally give the passengers the sensation of a real sea voyage. Later on, when some views are shown of the country through which the lines pass, it will give a better idea of the work needed to construct them.

BREAK OF GAUGE.

When the first line of railway was authorized in New South Wales, the Colonial Office, which at that time was under Mr. Gladstone's control, sent out a despatch urging the adopting of the 4-ft. 8½-in. gauge, but the engineer was strongly in favor of a 5-ft. 3-in. gauge, and it was started on that basis. Victoria and South Australia also started on that gauge. There was a change of engineer in New South Wales before much work was done, and the new man reverted to the original suggestion of 4-ft. 8½-in., and all the railways in New South Wales have been constructed on that gauge, while all Victorian lines are 5-ft. 3-in. gauge, South Australia are partly 5-ft. 3-in. and partly 3-ft. 6-in. All the lines in Queensland, Western Australia and Tasmania are 3-ft. 6-in., while the lines taken over by the Commonwealth from the South Australian Government are also 3-ft. 6-in. gauge, so at the present time Australia unfortunately has three different gauges—3,760 miles, 4-ft. 8½-in.; 4,151 miles, 5-ft. 3-in; and 8,815 miles, 3-ft. 6-in gauge.

The question of adopting a uniform gauge has been discussed for years, and the inconvenience and annoyance to travelers under the present system are frequently mentioned, and generally magni-

fied. There is not much, however, to complain about, for you can travel from Longreach, in Queensland, to Oodnadatta, in South Australia, a distance of 3,300 miles, passing through Brisbane, Sydney, Melbourne and Adelaide, the four principal cities of Australia, and you need only change on account of the break of gauge three times, first on the border of New South Wales and Queensland; second, at Albury, between New South Wales and Victoria; and third, at Terowie, 150 miles north of Adelaide. The great bar to the adoption of a uniform gauge is the heavy expense in the alteration of the roadway and in the rolling stock. The cheapest system to adopt would be the 3-ft. 6-in. gauge, but that is not likely to take place. The next least in expense would be the 4-ft. 8½-in., as all the roadway of the 5-ft. 3-in. would answer by moving the rails, and many of the cuttings and tunnels even on the 3-ft. 6-in. would be wide enough for the 4-ft. 8½-in. line. I notice, by recent reports, that the Commonwealth Government have decided on this gauge for the Transcontinental line from Port Augusta to Kalgoorlie. This will mean a break of gauge at each end of the line, unless South and West Australia alter their gauges, accordingly, which is not likely for some years to come.

LINES OWNED BY THE COMMONWEALTH.

By the transfer of the Northern Territory from the South Australian Government to the Commonwealth, the Federal Government have become the owners of two railways, one from Port Augusta to Oodnadatta, a distance of 478 miles, and the other from Port Darwin to Pine Creek, 145 miles; both lines are on the 3-ft. 6-in. gauge. These lines, 623 miles in all, have cost £3,420,000 or about £5,500 per mile. The general understanding on which the Northern Territory was transferred to the Commonwealth was that the Federal Government should construct two transcontinental railways, one connecting Western Australia with the east by constructing a line 1,050 miles long from Kalgoorlie to Port Augusta, the other to connect the Northern Territory with the south by building a line about the same length from Pine Creek to some point on the Port Augusta line. The route of the first of these lines from east to west has been agreed on, the survey made, and work is soon to commence. Unfortunately, there appears to be some misunderstanding over the proposed route for the Northern Territory line. It was generally understood, when the territory was transferred, that this proposed line would run from Pine Creek in the north to

Oodnadatta in the south, to connect with the South Australian lines. Some different opinions were expressed about the interpretation of the agreement, but both governments at the time said there was no necessity for doubt. It now seems as if there was great reason for the doubts expressed, for judging by the recent reports from Australia, the present Prime Minister, Mr. Fisher, seems more favorably inclined to connect the Pine Creek Railway with the Queensland lines than he is to take the direct and generally understood route straight across the continent from north to south; and it is questionable whether any assurance will be given to the South Australian Government in reference to the matter for some time, especially as there is a general election for the Commonwealth Parliament inside of 12 months. If the line is carried to the east, as suggested, and the center of Australia is left without a railway, the people of South Australia will deeply regret that clearly defined conditions were not insisted upon before the territory was transferred. The estimated cost of the construction of these two transcontinental lines is between four and five million pounds each, or, roughly speaking, about £9,000,000; this, added to the 3½ million liability on the lines already taken over by the Commonwealth, will amount to £12,500,000.

From purely a railway point of view, it is not likely that these lines would prove, for some years to come, paying undertakings. There are, however, two strong reasons for the work. In the first place, all military authorities for years have urged the necessity of these lines for defence purposes, more especially the line to connect Port Darwin with the south, thus affording the opportunity of direct communication with the establishing of a naval base in the north, where it would be most likely to be needed in time of attack. The second strong reason more particularly for the north to south line is that the Commonwealth, having taken over the Northern Territory, have on their hands 335,000,000 acres of practically undeveloped and unoccupied land, nearly four and a half times as much as the United Kingdom with its population of 45,000,000, while this vast territory is populated by about 1,000 whites, less than 2,000 Chinese and a few thousand aborigines. This vast tract of land can only be properly settled and developed by opening up means of ready communication and transport, and Australia is now realizing this fact more clearly than it did years ago; and those who have watched the aggressive progress of the eastern countries, with

their overcrowded millions, must see the necessity for speedy development and settlement in Australia.

AUSTRALIA'S PROSPERITY.

The great prosperity of Australia during the last few years has given a decided impetus to railway construction, and today there are more miles of railway in course of construction, and projected, than at any previous time in its history. Many of these lines, in Queensland, Western Australia and South Australia, are being cheaply constructed as feeders to main lines, and to open up the pastoral and agricultural lands. It is well to note here that by the use of artificial manures and more scientific farming, millions of acres are now being settled as agricultural land which a few years ago was only considered fit for pastoral purposes, and some of it but of little value even for pasture.

PRIVATE RAILWAYS.

In addition to the Government railways, there are about 1,200 miles of private-owned lines in Australia, about half of which are used for passenger as well as goods traffic, while the other 600 miles are used chiefly for carrying minerals and timber. The capital cost of these lines is between three and four million pounds.

TRAMWAYS.

The electric tramways of New South Wales belong to the government, and in South Australia the Government principally controls them in conjunction with the municipal authorities. In the other states the tramways belong to private companies, but will eventually become the property of the corporations. Melbourne has the cable tramway system, and, owing to its expense in construction, it has not extended to the surrounding suburbs to the same extent as the suburban railways have, which the Victorian Government now proposes to electrify.

STATE OWNERSHIP.

There has always been a division of opinion in reference to the advisability or otherwise of state-owned railways. While, generally speaking, Australians themselves are in favor of the system, there are still some exceptions, who think it would have been better to have kept to private enterprise. From many years' experience in Australia, and from an intimate acquaintance with the working of the railways in one of the states, and a general knowledge of

the others, my opinion is that, taking into consideration that the Government were the owners of the land principally to be developed and settled, and that the settlement could not be effectually carried out without means of transit, that the interest of the public has been best studied and preserved by the state-owned system.

DIFFICULTIES AND DANGERS.

It must not be considered, however, that there are no difficulties or dangers in connection with state-owned railways. Before the appointment of railway commissioners in the different states, the political danger was an apparent one, for even Australian politics in years gone by were not proof against advocating the construction of certain lines when earnestly pressed by interested constituents, especially where majorities at election times were small; and members for districts in which there were large numbers of railway electors may in some unguarded or over-anxious moments have made promises which to fulfil might not have been beneficial to the state. By placing the construction and control of the railways under commissioners with extensive powers, these dangers have, to a certain extent, been obviated. There is also the danger of strikes, and although not as likely on the Government lines as on private ones, there is no absolute certainty that they might not take place. Some years ago, in one of the states, the President of the Railway Association, who was not a railwayman, but a member of Parliament, lent such encouragement to the men's claims—claims that could not be granted by the Government—that a strike was threatened, and were it not for the good advice of other members and some of the leading railway officials themselves, trouble might have occurred. Since then, in 1903, as is well known, there was a railway strike in Victoria, which was of a somewhat serious character. This strike was brought about by over-zealous leaders of the employes against the advice given them by some of the more responsible and cautious men. The result was most unsatisfactory, so far as the men were concerned, for instead of their gaining the sympathy of the public as they anticipated the inconvenience and disorganization caused by the strike turned the sympathy to the government and against the strikers, and in the end the men found, to their sorrow, that there was no good result to themselves, but for some of them loss and disappointment. Since that time there have been no railway strikes except in connection with the tram-

ways in Sydney, Brisbane and Perth, and in all cases the result has been unfavorable to the strikers.

A statement that is often made against the Government system is that you do not get the best and most able men, and that employes are not as industrious as on private works. But little reliance can be put on these statements, for it stands to reason that governments can afford to secure the very best men to manage their works just as well as the private companies can. In fact, many of the railway commissioners, as well as the engineers and general traffic managers, have been selected from the leading officials of private companies, and some of the private companies have been glad to avail themselves of the services of men who have gained extra experience in Australia. One prominent case of this kind was the late Mr. Mathieson, manager of the Midland Company, and Sir Thomas Tait, late Commissioner of Railways in Victoria, is reported to have been offered a very important position in one of the leading railway companies of Canada. Traveling accommodation and fares for passengers, and freight rates for goods, compare favorably with the railways even in older and more thickly settled countries. In fact, the freight charges on agricultural, pastoral, and mineral products are in many cases exceptionally low, in order to encourage settlement and development.

The government ownership of railways in Australia is often used as an argument by advocates of a national system in Great Britain. This is a matter, however, that does not come within the scope of this paper further than to add that the conditions of the two countries and the circumstances under which the railways have been constructed are so different that the greatest consideration should be given to such an important proposal. The result of nationalization might be the exact opposite to that expected by some of its warmest advocates. If the nation as a whole is to benefit, it might mean a great reduction in the number of employes and much inconvenience to traders and residents in certain localities; on the other hand, if the employes and trading public are to benefit by the change, it might result in a heavy national loss.

REVIEW OF THE WORKING OF THE FRENCH STATE RAILWAYS FROM 1909 TO 1911.

BY C. COLSON, MEMBER OF THE INSTITUTE, INSPECTOR-GENERAL OF BRIDGES AND ROADS, COUNCILLOR OF STATE OF FRANCE.

From the *Revue politique et parlementaire*.¹

To begin with, we must apologize to the reader of the *Revue* for the delay in the publication of an article which under normal circumstances should have appeared in November. The rules of public accountancy specify that expenses incurred during a financial year must be charged in the accounts of that year, even if they are only paid during the first few months of the following year. Thus they do not enable the administration of the State Railway to make up its accounts as soon as the companies, and the numerous questions which always arise when a new system is started naturally led to further delays in making up the accounts of the years in question. We have only received during the last few days the factors necessary for the accurate analysis of the results, for the last financial year, of working the old system of the State Railway and the system bought up from the Western Railway Company. We thought we should better meet the wishes of our readers by putting off for a month our usual article, than by postponing to February a question of such paramount importance to the state of the public finances.

The influence of the buying up of the Western system on the French budget makes itself felt nearly uniquely by the results of the traffic accounts. We know that the conditions of the purchase were such that the shareholders received exactly the same revenue as before. The State, which receives the net profits yielded by the railway formerly owned by them, pays them that revenue as an annuity, while it formerly made up that amount as guaranteed interest. The deficit it has to meet hence only varies to the extent that the net profits, which go to reducing the capital charges, vary by the effect of the change of administration. The addition to capital of the deficit of the year before the purchase certainly was one of those disguised loans which lighten one budget at the expense of future budgets. The development given, with good reason, to supplementary constructional works will in the future increase the capital

¹ English version from the Bulletin of the International Railway Congress.

charges very largely. But these are facts which only exercise a secondary influence on the magnitude of the deficits which have to be met, and it is in the traffic accounts that we find today the essential element for appreciating the financial results of the State working. As yet one hardly hears any remark that the service now supplied to the public is better than that of the company, which was so severely criticized. What difference is there as regards net cost? That is what the examination of the accounts for 1910 and of the credits asked for 1911 and 1912 will show us. We also have to consider to what extent the differences result from causes which would have equally affected both the company and the State, and that is a question difficult to solve.

In the table below, we give comparative figures for the last three financial years of the administration of the old State Railway system,

TABLE I.

Railway.....	Old Railway System			Nationalized Western Railway		
Year.....	1908	1909	1910	1908	1909	1910
Mean Length Worked, Miles...	1,844	1,844	1,844	3,683	3,683	3,702
Working Results:						
Receipts:						
Passengers.....	\$ 3,821,400	\$ 3,840,700	\$ 3,879,300	\$17,601,600	\$17,794,600	\$18,180,600
Additional Quick Freight.....	1,563,300	1,698,400	1,775,600	4,940,800	5,056,600	5,249,600
Slow Freight....	5,886,500	6,214,600	6,407,600	18,045,500	18,006,900	19,512,300
Other Receipts...	115,800	96,500	135,100	1,408,900	1,466,800	1,370,300
Total Receipts....	11,387,000	11,850,200	12,197,600	41,996,800	42,324,900	44,312,800
Expenses:						
Management and Administration.	96,500	57,900	77,200	212,300	212,300	250,900
Working.....	2,721,300	2,663,400	2,972,200	11,001,000	10,865,900	12,409,900
Locomotives and Rolling Stock..	3,338,900	3,358,200	3,667,000	10,653,600	10,788,700	12,120,400
Way and Works...	2,123,000	2,277,400	2,431,800	3,917,900	5,095,200	6,504,100
Miscellaneous....	907,100	945,700	984,300	2,779,200	3,338,900	3,628,400
Total Expenses....	9,186,800	9,302,600	10,132,500	28,564,000	30,301,000	34,913,700
Net Profit.....	2,200,200	2,547,600	2,065,100	13,432,800	12,023,900	9,399,100
Capital Expendi- ture, per year:						
New Lines.....	1,408,900	1,601,900	1,351,000	1,042,200	347,400	366,700
Supplementary Works.....	1,177,300	1,022,900	1,621,200	1,756,300	1,389,600	6,793,600
Stocks and Tools.	1,177,300	1,080,800	1,158,000	4,226,700	4,207,400	4,496,900
Receipts per mile...	6,188	6,437	6,624	11,413	11,507	11,973
Coefficient of Work- ing.....	80.7	78.4	83	68	71.7	78.8
Train Mileage.....	11,532,000	11,656,000	11,904,000	35,402,000	36,084,000	36,704,000
Average Rate per Passenger Mile...	.945c	.945c	.936c	1.01c	1.00c	.998c
Average Rate per Ton Mile Slow Freight.....	1.47c	1.46c	1.46c	1.49c	1.48c	1.49c

and also for those of the Western Railway, now bought up. In the latter case, the figures for 1908 are given arranged in the form adopted by the administration in the 1909 accounts, so as to make it possible to compare the last year's operation by the company with the first year's operation by the State. The 1909 and 1910 figures, moreover, include the expenses called normal by that administration, those it calls arrears left by the Western Company, and which amount to about \$1,486,100 for each of those two financial years. These expenses, by their nature, are in fact included among those which every railway administration which keeps its accounts properly includes among normal expenses, and there is no reason for thinking that from the point of view of maintenance and of working expenses, the business taken over by the State is burdened by any exceptional charges.

That is a point which it is necessary to mention and to lay stress on, for it is one of those which have given rise to very vexatious misunderstandings. All the information which it is possible to collect, from the engineers of the State administration, from those of the old company and from those of the head authorities, shows very clearly that the Western Company, till the very last days of its existence, kept its system in a good state of maintenance. The expenditure on track renewals had diminished from 1901 onwards; but this was not due to measures taken in consequence of the prospective nationalization but to the completion of very important works undertaken in the preceding years, and the completion of which was so well foreseen that it had for years been announced by the company in all its reports. One can criticize this management of the expenses, but it is impossible to conclude that the state of the tracks endangered safety and that it imposed any abnormal burdens on the new administrations. All that is not strengthening the track or altering constructive works in the so-called arrears, is normal maintenance and should figure in the working expenses, according to the rules invariably adopted in companies' accounts. It is true that the administration of the State Railway already some years ago obtained authorization to charge to supplementary works certain repairs of tracks which it had been working for about twenty years, the sole object being to reduce its coefficient of working; but this was an abuse and it would certainly have been unwise to introduce this into the accounts of the bought up system.

In saying this, we do not wish to assert that the state of the old Western Railway was satisfactory. But what really showed deplorable arrears was the rolling stock, and also the supplementary works necessary in consequence of the growth of the traffic. Those are expenses which do not appear in the working accounts and the postponement of which could neither increase the net profits during the last years of the company, nor reduce them during the first few years of the State management, except perhaps indirectly, owing to the reflex influence of the insufficiency of the installations on the progress of the service. It is hence necessary to include the so-called arrears among the normal expenses of 1909 and 1910, if a proper comparison is to be made between the results of the last few financial years, and this we have accordingly done in the table given below.

This table shows how quickly the real net profits of the bought up system are decreasing. However, we could not consider as exceptionally high the net profits of \$13,432,000 obtained by the company in 1908, its last year of working, when the corresponding figures were \$15,440,000 in 1907 and \$17,177,000 in 1906; while the average for the ten years before the nationalization was about \$15,000,000. In order to make the variations shown in the table intelligible, they should be compared with those of the preceding years, and also with those obtained during the same years on the system of the five large companies which have not been nationalized. It is, of course, clear that these comparisons can only apply to the absolute magnitude of the variations in receipts or working expenses of a very unequal character, and it is the importance of those variations, as compared with the figures to which they apply, namely the percentage, which is to be compared. The following table contains a summary of this for the last four years.

TABLE II.

	1906 to 1907		1907 to 1908		1908 to 1909		1909 to 1910	
	West- ern	Other Com- panies	West- ern	Other Com- panies	West- ern	Other Com- panies	West- ern	Other Com- panies
Increase in Receipts (Thous- and Dollars)	231.6	675.5	598.3	308.8	154.4	501.8	907.1	521.1
Increase in Expenses (Thousand Dollars)	1,949.3	1,949.3	2,509.0	752.7	1,117.3	675.5	2,933.6	656.2
Decrease in Net (Thousand Dollars)	2,065.1	617.6	2,740.6	193.0	2,026.5	*328.1	4,207.4	*347.4

*Increase.

From 1906 to 1907, the difference between the results of the Western Railway and those of the other companies consisted solely in the smaller importance of the earnings on a line where industries, which were then flourishing, are not of much importance. In 1908 the expenses showed an abnormal rise, partly owing to working troubles caused by the precarious situation of the company, partly owing to the hurry taken, at the demand of the government, in regulating the accounts before the nationalization. Many of the expenses which in the ordinary course of events would have appeared in the 1909 accounts were included in the 1908 accounts, in consequence of the practice adopted by the companies in charging expenses at the date they are paid, not at that at which they are incurred. In 1909, the expenses of the State administration were still further increased by passing from the system of annual accounts to that of accounts for the financial year, although the effects of this change had been reduced by the hasty payments made by the company, the effects being divided between the financial years of 1908 and 1909; as we remarked in this place last year, the real increase of expenditure resulting from the change of regime was only an insignificant amount in that first financial year.

The increases resulting from the fact that the accounts for 1908 and those for 1909 each included in reality the expenses of a little more than a year should have disappeared in 1910, seeing that the payments included in the accounts of that year by the application of the system of the financial year were practically counterbalanced by the decreases resulting during the first few months from the application of the same principle to the payments made in 1909. It would hence have been natural to find a decrease in expenses counterbalancing what had been abnormal in the increases of the two preceding years. But 1910 was a calamitous year for the French railways. Floods and strikes had a very evil influence on the nationalized railway. It is a curious fact that the exceptionally rainy season which had such a serious effect on the receipts of lines catering for the agricultural districts or the health resorts in the center and the south of France, did not prevent the system of the State Railway from obtaining greater earnings than usual; the stoppage of navigation brought back to the railway much traffic of sufficient importance largely to counterbalance losses due to other influences. Only in order to meet these requirements, while there were so many disturbing elements at work, it was necessary to incur rather heavy ex-

penditure, while at the same time the irregularities in the service led to exceptionally heavy claims, and, moreover, the effect of the increases of pay granted by the new administration began to make itself felt.

Although the former causes had an accidental and temporary character, the latter on the contrary continued to develop its effects, and materially increased the expenses in 1911, for the first time. We can form an idea of the results to be expected, from the demands for supplementary estimates laid before the chambers in order to meet them. We can also form some idea of the probable receipts, by assuming that the earnings of the last six weeks of the financial year of 1911 will be approximately equal to those of the most recent weeks, returns for which have been published. The results of working the two State systems in 1911 will thus approximately be:

TABLE III.

	Old System			Western Nationalized		
	Original Budget	Increases	Total	Original Budget	Increases	Total
Receipts.....	\$12,583,600	\$ 154,400	\$12,738,000	\$44,369,000	\$ 579,000	\$45,548,000
Expenses.....	10,306,200	887,800	11,194,000	33,060,900	6,233,900	39,294,800
Net Profit.....	2,277,400	.....	1,544,000	11,908,100	.....	6,253,200

The net profits will accordingly show a new reduction of \$3,000,000. But besides the credits for what are called normal expenses, the budget provides, among the extraordinary expenditure to be met by means of loans,—\$2,195,000 for arrears left by the Western Company. If this expenditure consisted wholly of maintenance and working expenses, it would be necessary to subtract this whole amount from the net profits in order to determine their actual amount, which would thus be reduced to \$4,058,200. If the expenditure which did not represent any real increase in the capital value of the railway only formed a sum of \$1,350,000 to \$1,540,000 out of the total, equal to that which we had to include in the working expenses of 1909 and 1910 in order to obtain the correct figures in our table, the correction necessary would still reduce the net profits to \$4,800,000. Finally, if the correction is not made in any of the three financial years, and if the system of calculation adopted by the State is considered satisfactory, we find for 1909, the first year of its working, net profits practically equal to those for 1908,

but the reduction to be recorded since its installation would remain nearly \$3,000,000 in 1910 and \$5,000,000 in 1911, or more than \$7,000,000 in the two years. Taking, on the other hand, as the normal net profits at the moment the concession terminated, the average for the ten preceding years (and not the figures for 1908, reduced by the special circumstances connected with the nationalization), the annual loss, according to the probable results for 1911, will vary between \$8,600,000 and \$10,600,000, according to the strictness with which the arrears of the Western Company will be included among the working expenses.

Serious arguments can be brought forward in support of all these methods of calculation, and, on the other hand, the final figures for 1911 may differ materially from those which the present position of the receipts and the credits asked for allow us to forecast. We think, however, that we may be certain that we do not stray far from truth when we say that the reduction in the net profits, after three years of State working, will be between \$7,700,000 and \$9,600,000 (say half more), for a year (1911) to which no external circumstance gives any exceptional character, from the point of view of receipts or of expenses. Before the nationalization we said (and the event has confirmed it) that the operation would have no result from the point of view of the relations between the State and the company, that consequently its financial results would depend exclusively on the difference between the company's management and the State's management. It was difficult to doubt, after all the experience gained in France and abroad, that State working would be, for one and the same kind of service, more expensive than working by a concessionary. Would it be right to say that the new experiment had confirmed this opinion, to that very large extent that the figures given above show?

In the first place, it is only right to state that in the increase in the expenses during the last three years there are certain elements which have a temporary character; the difficulties and even the disorganization of the service, which will soon become reduced and it is to be hoped will in the end disappear, entailed extra expenses and the payment of claims of much greater amount than normally; the compensations for loss, damage and delay, which were already excessive in the preceding years, again doubled in 1911. On the other hand, without accepting the fable of badly maintained tracks, it must be recognized that the system of general repair adopted by

the Western Company, having come to an end in 1901, had sooner or later to result in a recurrence of the expenditure previously described as exceptional by the company. Finally, the extension of the supplementary works charged to capital account is also not without influence on the working account, as there is the very wise rule on all railways that that account is immediately debited the cost of the installations done away with. The actual increases in the expenditure hence include several million francs which will gradually disappear in the future.

There are also some due to causes which burden all railway administrations. Everywhere the general rise in prices and in wages, increasing the expenditure on materials and on the staff necessary, increases the net cost of carriage and we know that in many countries State administrations and companies are compelled to try to counteract the increase in their expenses by raising their rates. In France the need of raising certain wages, especially in the lowest grades, makes itself felt on all the railways. In addition to these sacrifices which are indispensable in order to keep the remuneration of the employes at a proper level corresponding to the state of prices generally, recent legislation has added others in order to give retired employes pensions quite out of proportion to those which the State grants its own employes. Because the companies had taken generous initiatives in this direction, the legislature has compelled them all to adopt, in every respect, the most costly solution of those which had been preferred in the different regulations, and sometimes even go further. The expenditure imposed by the pension law would evidently have increased the working expenses to the same extent if the railway had not been nationalized.

On the other railways, the extra charges incurred in 1909 and 1910 were appreciable; however, the companies on the whole, although they had rather less earnings to meet them than the State, succeeded in slightly increasing their net profits. It hardly seems doubtful to us that in 1911, the first year that the pension law came into force, these profits will finally show a slight decrease on the whole of the railways operated by companies. Nothing, however, as yet makes it probable that there will be a collapse anything like that shown by the figures given above for the State system.

A summary of the share of the employes in this increased expenditure is given below, taken from the preamble of the supplementary budget for the State Railways for 1912. The figures refer to this

future budget and as a considerable part of the increases only came into force on October 1, 1911, they no doubt exceed appreciably those for that year.

TABLE IV.

Expenditure on Staff	Old System	System Nationalized
Expenses in 1908:		
Salaries and Sundry Allowances.....	\$ 4,325,323	\$13,938,653
Contributions Toward Pensions.....	371,718	1,323,015
Improvement of the Status of the Employees in the Service at the Time of Nationalization:		
Salaries and Sundry Allowances.....	898,222	4,465,827
Contributions toward Pensions.....	188,561	614,512
Normal Increase (Deductions Made for Dismissals, Retirements, etc.).....	270,200	1,080,800
Increase in Staff in Four Years.....	414,950	2,258,100
Total Expenses Provided in 1912.....	\$6,468,974	\$23,680,907
Total Increase in Four Years.....	1,771,933	8,419,239

Thus the expenditure incurred for improving the lot of the employes in 1908 amounted on both systems together to \$6,000,000 in which payments towards pensions only figured for \$700,000. On the Western system, the increases in pay, premiums and sundry allowances amounted to 32 per cent of the sums previously granted, and on the old railway, the generosity of which towards its employes was, however, always extolled, it amounted to just over 20 per cent.

Now if by means of these sacrifices which have to be paid by the tax payers of the whole of France, the administration of the State Railway had secured the devoted services and the gratitude of its employes, one might perhaps maintain that it had not paid too much for such a manifest advantage to itself and to its customers. But if there is one point about which there is a general agreement among all those who are in direct contact with the employes of the nationalized railway, it is that these employes have never been less zealous and more fertile in complaints and recriminations; some trace the origin of this state of affairs to the bad habits formerly tolerated by the company, others attribute this corruption of employes formerly satisfactory to the agitation spread by the partisans of nationalization and to the sudden introduction of State regulations on a railway system to which they were not suited; but that is the only disagreement.

There may be some truth in both of these statements. But it would require a rather curious psychology to believe that one can

put an end to all discontent by giving away millions. There is a custom of treating as out-of-date platitudes the statements of economists who show that the intervention of the public authorities to fix prices otherwise than in accordance with the laws of supply and demand produces disastrous effects, even when no conflicts result, for it is the budget which pays. However, experience once again shows, on the nationalized railway, how dangerous it is to give men the impression that violent complaints, strikes, political agitation, can obtain for them increases of pay which the economic situation does not justify.

The administration of the State Railway, like any other employer, would no doubt have received gratitude from its employes if it had gradually granted, without showing any ill will about it, the increases necessary in order to bring the pay to a level corresponding to the general state of the labor market, and compatible with the financial requirements. By suddenly granting, at the eve of the strike or the day after it, increases absorbing nearly half of its net profits, it gave its employes the impression that the sole reason for its concessions was the fear which it had been possible to inspire into it, and the parliamentary influence of the representatives of a staff which had known how to find an advocate for the increase of expenditure in the president of the commission of the budget for that financial year. Then one saw this astonishing spectacle: the nominal defender of the budget compelling a weak public administration to incur expenditure which it did not deem necessary. The thoughtlessness with which decisions were arrived at, has since been made evident by the impossibility of establishing proper budget provision to allow for them. Nevertheless the employes have been showing, since then, more discontent than satisfaction. In fact as soon as it is admitted that it is good will towards the workers, and not the value of their work, which is to regulate their pay, there is really no reason why they should be contented with 5 francs (97 cents) per day, rather than with 6 francs (\$1.16). with 7 francs (\$1.36), etc. By allowing these conceptions to be applied by the administration of its railway system, the State runs the risk of seeing the amount of work done by its men reduced to that observed in the case of match-makers, who receive exorbitant pay for poor work, or in that of door openers, whose pay it is true is but poor, but is obtained in many cases with hardly any work to do.

The impression of weakness, of contempt for the financial results, spread among the employes by the prodigality which the figures given above make clear, is certainly one of the causes which have led to the general relaxation of discipline to which is due the bad progress of the service, which is made evident by the many complaints of the customers of the State Railway and recognized in both chambers by many of the partisans of the nationalization. The defenders of the State administration now lay stress on the special difficulties connected with the operation of the State system, whose traffic consists chiefly of troublesome items, such as seasonal traffic to the seaside, suburban services requiring many sidings at stations for very small returns, harvests exceptionally variable, such as apples, arrivals from the sea making it necessary to have the platforms free almost every day, etc., In addition to all these causes of irregularity, there is the existence of a navigable waterway, going along the main line, which takes the greater part of the receipts during normal times and which on some days sends to the railway, in case of ice, of low water and of flood, a traffic far greater than that it generally receives. We wish to confirm here that the administration of the State Railway has in fact to contend with difficulties which seldom are found united; and we only regret that its partisans have so often treated these same considerations as vain pretexts invented to excuse the incapacity of the company when the opponents of nationalization brought them forward formerly.

In order to meet all these difficulties, the administration of the State Railway received a railway system which, it must also be admitted, was not equal to requirements, and it is from this point of view alone that the celebrated arrears that we mentioned at the beginning of this article, exist. This was not a state of affairs peculiar to this railway system. We have several times explained in the *Revue* that by a singular coincidence, simultaneously on the railways of nearly all the chief industrial countries, the great rush of traffic in 1907 had not only caused the reappearance of the difficulties bound to arise during all exceptionally busy periods, but had passed the limit beyond which it was no longer possible to deal with the growth of the traffic, by means of smaller improvements. Hence, nearly everywhere it became necessary to increase the traffic capacity of the railway by duplicating many lines, by building several new lines, by constructing large shunting and sorting yards, by enlarging the stations in large centers, in fact by undertaking a large

quantity of work taking a long time. Business suffered from this state of affairs in Germany and in the United States even more than with us, and acquiring new rolling stock could not remedy it, for it was above all the installations indispensable for the utilization of that rolling stock which were insufficient.

It is right to remark, in this connection, that the recovery which actually succeeded the slump at the end of 1907 (a little earlier than the ordinary alternation of periods of depression and prosperity led one to foresee) came before many railway administrations were really able to put themselves in such a position as to be quite ready for it. In Prussia, official statistics show that the number of wagons supplied to the mines, from October 16 to 31, 1911, is lower than the number asked for, by a proportion varying, according to the coal basin, between 21.8 per cent (Saar district) and 36.8 per cent (Lower Silesia). As regards the Ruhr district, it is stated that "never have the mines suffered such loss for this reason, so that it is out of place to talk of a scarcity of wagons; there is an actual wagon famine, presenting all the characters of a real famine." The same situation is stated to exist at Mannheim as regards traffic generally. It is aggravated by the difficulties of the navigation on rivers, as the water is very low in consequence of the exceptionally dry summer; for in Germany, as in France, the railway is only applied to when shipping, owing to the irregularities to which it is liable and to its absolute want of elasticity, not only does not carry the same share of the extra traffic as it does of the ordinary traffic, but also raises its rates and hence diverts to the railways part of its ordinary traffic just at the moment the latter are hardly able to satisfy the needs of their own customers.

To return to the nationalized railway, it has to be remarked, as an excuse for the present administration, that the execution of the works necessary for coping with any growth of the traffic, for making possible the necessary increase in the weight of goods trains and in the speed of passenger trains was there more behindhand than elsewhere. The bad financial state of the company, the indecision of the governments who were sufficiently wise to oppose the nationalization and too weak to bring to a head the agreements always being prepared in order to avoid it, had resulted in producing a state of uncertainty which had led to the postponement of most of the projects prepared by the engineers, in order to facilitate the clearing of the tracks, the reception of the trains and the quick

circulation of the rolling stock, under the conditions which would necessarily arise if traffic grew. It was only during the last few months of its existence that the company, no longer daring to accept responsibility for the suburban service, with means which had become utterly inadequate, decided to bring forward the scheme for electrifying the lines ending at Saint-Lazare station and for reconstructing that station, and to disregard the reproach of presumption which it incurred by speaking of building and of constructing, just before its death.

The administration of the State Railway has again taken up this scheme, and widened its scope, so that it will involve an expenditure of about \$27,000,000. There is some talk of a nearly equal expenditure on sorting yards and on the reconstruction of the chief stations of the railway, and of an expenditure of about \$7,700,000 on sundry junction lines. What with the duplications and the strengthening of the tracks, the construction of new lines, especially to give another route between Havre and Paris, the reconstruction of Montparnasse station and the electrification of the lines ending there, the figure of \$96,500,000 of capital, to be spent within a comparatively short period, will be much exceeded. The expenditure of this kind, on both of the railway systems together, already increased from \$10,000,000 in 1909 to \$15,800,000 in 1910, and the credits voted or asked for amount to nearly \$27,000,000 for 1911 and to \$19,300,000 for 1912, not counting the \$4,800,000 to be taken during the course of each of these two financial years from the produce of loans for increasing the reserves and the working capital and for wiping out the arrears. In addition, the interest on the stock to be issued will also form a large item in the budgets of the State railway system, and if the net profits do not grow rapidly, the deficit will grow very serious. In this respect, as in that of the employees, it is of importance that the administration of the State Railway should do what is necessary as quickly as possible, but it must not think that the best way of answering the attacks aimed at it is the indiscriminate expenditure of money. Too sudden advances are often followed by sudden stops, and the State, which is investigating the means of dealing with crises arising from the stoppage of work, has too often aggravated them by its haste in immediately starting works which it has then had to stop in order to avoid financial disasters.

As regards more especially the increase of rolling stock, it is not long ago that the representatives of the State system, in a commis-

sion over which we had the honor to preside, recognized the very serious inconvenience to national industry as well as to railways, of irregularity in the orders from companies. Is there not some forgetfulness of what they then said, in the enormous orders for rolling stock which it will be difficult to utilize in the present state of affairs, in those for materials for stationary work which is rather far off, in consequence of which financial necessities will perhaps compel the retrenchment of expenditure, just at the time when it is necessary to increase it in order to counteract the lack of work, and when it may be possible to obtain more favorable prices from works which are not fully occupied?

We have just examined the financial position of the two nationalized systems. But in the operation of railways, the financial result is not the most important one; one may almost say that it is a secondary one, of such vital interest is the proper operation of the service to all the places concerned. From this point of view, what are the causes of the disorganization existing on the State system? It is impossible for us to avoid expressing our opinion on this subject, for it is at present the most serious question in connection with the traffic.

We already referred to one of the more important causes of the existing difficulties, when we mentioned the arrears left by the company, not as regards the maintenance of its tracks and its safety appliances, for from this point of view the most careful supervision had not found anything to reproach the company with, but from the point of view of the indispensable extensions in the installations, the equipment and the staff, so as to be able to meet future needs. As regards this point, the responsibility is equally divided between the company, who managed the affairs of the railway until 1908, and its adversaries who by urging incessantly that the company should end, made it really very difficult for it to work with an eye to the future. Above all it was the delay in the vote of the senate which was vexatious, and that for two reasons: first, it was about the time of the vote of the chamber that the necessity for a great effort became apparent, on the Western Railway as well as on others, and consequently it was at that time that the delay began to be very serious. Second, it was starting from the time at which the vote of the chamber gave the proposed nationalization the character of a really serious threat, that the employes began to set at defiance the authority of their chiefs, and that the anarchy

became developed which already disorganized the service during the last days of the company. The senatorial commission, which had decided at first to reject the measure and which would no doubt have obtained the requisite majority at that moment, did not wish to risk the downfall of a minister who raised the question of confidence, and the resulting compromises certainly seriously aggravated the difficulties of the situation.

The day after the vote of the senate, we even expressed the opinion here that once the public authorities had decided to take the Western Railway out of the hands of the chiefs who managed it, there was nobody able to replace them outside the administration of the State system. Even the men who regretted to see that administration obtain that reward for the part it had taken in the campaign involving such serious risks, saw no other solution, and we continue to think that it would have been difficult to find one which was less bad.

Only by a curious stroke of retributive justice, it is just the campaign waged against the Western Railway Company which has been one of the chief causes of the faults which have so seriously aggravated the troubles inseparable from any change of management. By dint of always speaking of the incapacity of the company, one had ended by believing in it, and the new management thought in good faith that all that would be necessary would be to introduce its staff and its methods everywhere, and then all difficulties would cease. Instead of carefully studying the organization it took over, before attempting to modify it, instead of listening to the advice of the men who had taken part in developing it, it wanted to change everything at once. It divided all its services in half, without making any room among the new heads for any officers of the old company, who were disregarded and hardly even consulted. It considerably reduced the very necessary authority of the chief of each service over his subordinates, by appointing a special staff management which selects the men for difficult work, and gives rewards and punishments. It has introduced a whole organization of promotion and discipline committees which could give good results on a little railway system easy to operate, not containing any of those large agglomerations where heads readily become excited, but which would require serious modification before it could be applied to a much more difficult railway system and to employes upset by a long period of uncertainty with respect to their future. Finally,

by a singular contradiction, at the same time when it was full of complaints about the tool handed over to it, it imagined that it could do far more with this tool than the men expected who had previously been accustomed to handle it. Trains were multiplied, and the speed of the express trains was materially increased before any time had been spent to ascertain whether the rolling stock, the staff and the permanent way were able to cope with a denser and faster traffic.

The frame of mind of the authorities is well illustrated by an anecdote which we are unable to authenticate, but which reaches us from a reliable source. It may be remembered how some months ago Saint-Lazare station was blocked one fine morning in consequence of some delay in work which was carried out during the night, stopping for the time being the traffic on certain lines. When the causes of this incident were investigated, it was found that in order to ensure the proper execution of the work carried out under the exceptional difficulties which arise at one of the busiest stations in the world, where there are very many trains, the new administration had thought it necessary to send for one of the best foreman of their old railway system. It was quite surprised to find that the experience he had gained at Thouars did not enable him to carry out the work satisfactorily at Saint-Lazare.

The taking over of the nationalized railway took place under very satisfactory conditions and during the first few weeks it seemed that there had been considerable progress, all employees showing exceptional zeal, as is always the case at the beginning of a new regime. But the honeymoon does not last forever, and very soon the mistakes we have just mentioned, added to the difficulties of the situation, resulted in a disorder which led to a number of complaints far exceeding those made against the company. The working accidents increased in number and several produced real catastrophes. As regards railway men, it is by the frequency of accidents and of irregularities that the working is judged; but what moves public opinion is the number of the victims, and this is often only the result of a deplorable combination of circumstances. The minister of public works thought it necessary to dismiss the chief men. In replacing them, he had the happy thought of re-establishing the organization adopted on all large railway systems, namely, having the three great services dealing respectively with traffic, permanent way and traction. Each of these services or departments

have a technical chief who has authority to take or to propose all measures relating to the employes, and who consequently can be held responsible both for the faults of his subordinates and for his own.

The new management had the courage to reduce the number and the speed of the trains at once and to strengthen discipline; for some time there was then at least some regularity in the service. But this new honeymoon also came to an end; again complaints multiplied, again there is a disorder which makes itself felt everywhere and which it would be cruel to draw attention to, and again one hears of changes as regards the officials who manage the system.

Whatever steps may be taken it will not be possible to put an end to the existing difficulties in a day or two. Time is required for making the necessary improvements on trains, tracks and at stations where the work must be carried out without interrupting the service for a minute. Time is also required to re-establish cohesion and discipline in a body of employes who are very much upset, at a period when any strong measures in the case of the lower grades are hardly possible. Yet more time is required in order to find, train and advance gradually to the front rank those very rare men who are capable of satisfactorily filling the higher offices of a great service. One has seen, one will perhaps again see companies whose management was satisfactory neither to the public nor to the shareholders, where the chiefs who were growing old had been unable and unwilling to train up successors to themselves in sufficient numbers to meet all requirements. It has taken boards of management years to repair the mistakes made; they have had to follow, with perseverance, a wise course of conduct, training gradually new chiefs. But in such cases one at least had, in order to get over the times of difficulty, traditions guiding the whole of the employes and it was possible to appeal, in case of necessity, to men coming from outside, to whom were guaranteed positions equivalent to those they left. On the railway system bought up by the State, all traditions were upset, and nobody could guarantee to the most eminent chief the time necessary for properly carrying out a long work of reorganization. It would consequently be very difficult to find men skilled in the higher branches of railway work, who would be willing to leave a situation gained by a long period of work, in order to undertake a very difficult and uncertain piece of work,

particularly when they would by no means feel certain of being supported with sufficient attention and energy.

It is true that the finance act of 1911, in reorganizing the State Railway system, has given them a railway council which cannot direct them (that is not the work of the council), but can control the management, support it when encountering difficulties, correct if necessary any mistakes, and bring that foresight to bear without which all future progress is impossible. But this council is purely a consulting body and has very little authority, and considerable room is given in its composition to elements which will not contribute much towards its strength. The financial organization given to the railway system is satisfactory. It establishes the necessary distinction between capital account and working account; it provides means for regulating each year the amount added to the former, in accordance with its needs, not with the amounts available in the budget. Although it allows certain arrears to be charged to loans, it has at least limited the total amount of this to \$14,475,000. It provides that the capital charges should appear in the accounts regulating, as is the practice in the case of companies, the division of these charges into two parts, namely the part which will be definitely charged to the general budget of the State and that which it is advisable to charge to the special budget of the railway system; provision being of course made for the State to provide for deficits.

Experience will no doubt show that it will be necessary to correct this legislation in certain particulars, especially by giving the council more authority so as to ensure a certain stability in the management of the railway system; but in its essential features it forms a considerable improvement as compared with the preceding regime. Unfortunately laws and regulations are not able to remedy in a day a disorganization due partly to old mistakes, partly to recent errors, finally partly to the difficulties inherent in State working. We can but repeat the wish we expressed the day after the nationalization, namely to see at last the success of the administration of the nationalized railway system give the lie to the fears inspired, first, by its creation and then by its recent extension in those few holders of the old economic doctrines which considered the development of State industrial enterprises a serious danger.

GOVERNMENT RAILWAY OPERATION IN FRANCE ¹

BY PAUL LEROY-BEAULIEU.

The French government has owned and operated a system of railways, its own property, for about 35 years. This system had a limited extent at first, but gradually it was carried to about 1,860 miles. The management of it was very ordinary; it certainly had no pretension to being a "model system," or an experimental system, as was promised. It went on indifferently, with accidents relatively frequent—there being several sensational ones. It was almost unproductive, leaving only net earnings of \$2,300,000, or a maximum of \$2,900,000, which were out of all proportion to the purchase price or the value of the property.

It was argued, as excuse, that this system was badly placed between systems larger and better situated. The government wished to do something grander. In 1908 it obtained from Parliament—by several majority votes in the Senate, and against the opinion of all the financiers of that assembly, notably those of several ex-Ministers of Finance—authority for the purchase of the neighboring and much larger system, the Western Railway. To force the vote of the Senatorial Assembly, which opposed this action, M. Clemenceau found it necessary to declare that if they did not pass it he would resign.

M. Clemenceau, Chief of the Cabinet; M. Caillaux, then Minister of Finance; M. Barthou, then Minister of Public Works, gave the most positive, the most solemn, the most precise declarations that it would pay. As to the service of the system, it would be considerably improved; the people of the western provinces would experience benefits from the state management.

The purchase was voted. The system of the Western Company, comprising today about 3,700 miles, passed into the hands of the state, making a total of about 5,600 miles of railways belonging to the French government, about 372 miles less than the system of

¹A summary of an article in *L'Economiste* by one of the leading economists in France, prepared for the *Railway Gazette* (London).

the Paris-Lyons-Mediterranean Company, and more than any of the systems of the four other great companies.

Three years have passed since then. The last year of operation by the company was the year 1908. Everyone knows the deplorable effects of the government operation. It has been complete disorder for three years, which grows instead of lessening—the most frequent irregularities in the arrival and departure of trains; the most constant errors and phenomenal delays in the transportation and delivery of freight. The people, given poor service by the government in cases where they had no recourse to water transportation as a substitute or subsidiary, are perforce obliged to revive the old modes of transportation by wagon. In brief, at the end of three years the operation by the government appears as a public calamity and a financial disaster. Besides, sensational accidents succeed each other, not only on the Western state system, but on the old state system, the latter of which has been operated for nearly 35 years.

Let us state first the financial disaster. It ought to cost the state nothing more, Messieurs Clemenceau, Caillaux and Barthou assured us in their speeches to the Senate, after the purchase, than before. But we have prepared a comparative statement of the receipts and expenses of the system of the Western State before and after the purchase. It is edifying. We give it below:

Years.	Gross Receipts.	Expenses.	Net Receipts.
1908 (last year of operation by the company)	\$42,146,954	\$28,332,593	\$13,814,361
1909 (operated by state).....	42,332,813	29,486,926	12,845,887
1910 (operated by state).....	44,316,853	33,667,113	10,649,740
1911 (estimated)	44,971,702	39,284,243	5,687,459

Thus, though the gross receipts have advanced nearly \$3,000,000 in that period, the expenses have increased nearly \$11,000,000 and the net receipts have fallen more than \$8,000,000. The Western system realized \$13,800,000 net receipts during the last year of private operation. The first year of operation by the state, this figure was almost maintained, there being a loss of only \$1,000,000; the state had not yet had time to complicate and disorganize the service. The second year of state operation, the disorganization of service being accentuated, there was a new loss of almost \$2,200,000 in the net receipts; and at last, in the third year of operation by the

state, which year is approaching its end, the decline of net receipts, as we can foresee, will be more considerable; it approaches \$5,000,000. Since the purchase the net receipts of this vast system of 3,700 miles have been diminished more than \$8,000,000, or about 60 per cent. The net receipts tend to vanish completely. It will not be astonishing if nothing remains in two or three years from now. What has become of the promises of Messieurs Clemenceau, Cailiaux and Barthou in the discussion on the purchase? Whence come these frightful miscalculations? From the usual faults of federal administration in democratic countries—unstable personnel in high places; confirmed habits of prodigality, of favoritism; want of unanimity and discipline.

In order to quote only a few facts, they have increased enormously the office staff; doubled, indeed trebled, the number of employes; have created 3,000 places to reinforce the personnel of the stations, 900 for the train service, 380 for the track service, or an increase of effective force of 5,280 units; when the increase of traffic did not warrant more than a quarter, or a third at the most, of that increase. It has come to that point when the administration of the state railways does not know—as parliamentary reports testify—the importance of the actual working force of its staff. They have raised the larger part of the salaries, but there is still only a dissatisfied personnel. Unparalleled errors have been made in regard to materials and work.

The financial results of the operation by the state of the system of the old company of the West, already so deplorable, according to the statement above, appear yet to be bound to increase. The budget of 1911 foresaw really for that operation a deficit of 8,076,000. A demand of supplementary credits, recently disposed of and which will not perhaps be the last for that cause, added to it \$6,231,000. The total charge of the system for the state thus mounts up to \$14,307,000. But the old company of the West only demanded of the Treasury as guarantee of interest those sums which, according to the annual report, have varied in the recent period between a minimum of \$1,158,000 a year and a maximum of \$5,211,000; this last figure was attained only in the last year of operation, on account of divers charges of liquidation which without the purchase would have been divided among several accounts. In taking, nevertheless, as a term of comparison, this maximum figure of \$5,211,000

for the guarantee of interest, which at the outside would not have been prolonged beyond the year 1934, one sees that the additional burden on the people—that is to say, the taxpayers—due to the purchase attained \$9,096,000 in 1911.

These are financial results of the purchase of a property which, according to the assertions of the three Ministers, MM. Clemenceau, Caillaux and Barthou, would be self-supporting. "A clean transaction," they said, complacently. If the people enjoyed a convenient service—we do not say improved, but not deteriorated—we would not complain. But one knows the frightful disorganization of which the service of this unhappy system is the victim. In the Sessions of November 23 and 24 in the Senate the most formal and most certain declarations came from MM. Jenouvrier, d'Estournelles de Constant, Richard Waddington and Milliard, who described "the deplorable condition of the Western State system." These are the very terms of the order of the day voted by the Senate in the Session of November 24.

The operation of the railways by the state, outside all its monstrous irregularities, its frequent accidents, has gone back 50 years as compared with the operation of the company. After the first period, when the state increased the number of trains and had quicker service on several of them, it resolved, on the contrary, to reduce the number and the speed. M. Waddington, for example, demonstrated that the duration of the journey from Rouen to Paris, which in the last year of operation by the company (1908) was 2 hours and 11 minutes for 89 miles, is now 2 hours and 39 minutes, or 28 minutes more; which represents an increase of more than 20 per cent in the time of the journey. It is even 7 minutes longer in 1911 than in 1865; and then we were at the beginning of the operation of railways.

Yet the reduction in the number of trains and their decrease in speed are the least evil. We refer the reader who wishes to have precise details to the extraordinary revelations made by the different orators in the Senate, MM. Jenouvrier, d'Estournelles de Constant, Waddington and Milliard. They fill entirely a series of columns in the official journal of November 24 and 25 last. We content ourselves by reproducing here a resolution of the Chamber of Commerce of Evreux, from which M. Milliard had read:

"The Chamber of Commerce of Evreux, noting that the management of the railway of the Western State is more than ever unable to assure the transport of freight to its destination on its lines; noting that this incapacity throws into the greatest disturbance the commercial relations of our region and threatens to cause the ruin of its industries; noting that this situation is the cause of numerous legal processes, and necessitates the payment of large indemnities by the Western State Railway which are met largely by the taxpayers; noting, lastly, that because of the extension of the evil and the dissatisfaction which results from a general discontent, there is cause to dread an agitation of a violent character, such as has been produced by other causes in years past, therefore, calls the most serious attention of the competent ministers to the facts above noted and asks the promise that the condition will be remedied."

M. Milliard is senator from the Eure, and this is why he quotes the deliberation of the Chamber of Commerce of Evreux. His colleagues, representing the other departments of the system, could quote similar resolutions from the reports of the chamber of commerce of that region.

It is in vain that the government seeks to excuse its deplorable administration by throwing the responsibility on the old company. The latter has not been in possession for three years, and under its management the operation of the Western system—if it was not particularly remarkable—was very decent; the trains were more numerous and faster than at present. There was not then the lamentable disorder of which the people complain at the present time. There was besides (the company has proved it) no grave accident on its system. These accidents are multiplied today in a most distressing fashion; as much on the Western State system as on the old state system.

On that old system which the state has operated for nearly 35 years was that horrible accident of Montreuil-Bellay, by the failure of the bridge and the precipitation of a train into the Thouet river. Hardly four years ago there was, on that same old state system, a frightful accident of the same nature, within 37 miles of the same place on August 4, 1907, at the Ponts-de-Cé, causing the death of 30 passengers. Let us recall another accident, recent also, which happened suddenly, causing the death of 40 passengers; also, of

course, on the old state system at Saujon, near Bordeaux, in August, 1910. Add to these on the Western State system the accident of Villepreux, June 18, 1910, where there were 18 deaths; then that of Bernay, September 10, 1910, with 10 victims; and, still on the Western State, the accident of Courville, February 14, 1911, where there were 10 deaths.

The six greatest accidents which have taken place in France during four years, those of Ponts-de-Cé, Villepreux, Saujon, Bernay, Courville and Montreuil-Bellay, have all happened on the State railways—three on the Western State and three on the old State system, which the State operated for nearly 35 years, and which is only 1,855 miles long, or about one-fifteenth of the length of the systems under private management.

The French Government owns different monopolies, those of tobacco, matches and powder. It has possessed itself of another monopoly for several years more or less, that of homicidal railway accidents. Six fatal accidents to passenger trains in four years, equally divided between the Western State and the old State system! And this deadly management imposes on the French taxpayers \$9,650,000 annual charges! Here is the great "reform!" Here the masterpiece! The Senate closed its discussion on November 24 by an order of the day which it is well to reproduce:

"The Senate sends the testimony of its profound sympathy to the families of the victims of the catastrophe of Montreuil-Bellay and its congratulations to the rescuers; taking account of the declarations of the Minister of Public Works, of the efforts made to lighten the deplorable condition of the system of the Western State Railway System, and trusting to the government to put a stop to the insecurity as well as the irregularity of its administration."

Thus "the deplorable condition of the system, the insecurity and irregularity of the management" are solemnly stated by the Senate. The system operated by the State represents among the French railways the drunken slave among the Greeks. How can one stop this plague? According to our opinion, there is only one remedy, and we hope that it will soon come; it is other management than that of the State system. Certain persons wish that this horrible costly experiment may be prolonged. It is an abyss. The democratic Government, inclined to demagoguery, having a varying personnel practising favoritism, favoring want of discipline, and habituated to prodigality and want of unanimity, is incapable of conducting with

method, surety and economy a complicated industrial work. We are having it fully demonstrated. No matter how well-advised and wise, the rules of the State administration cannot have the suppleness of those of private management. The same men in the service of the State cannot be as valuable as in the service of independent companies, because they are subjected to many more hindrances, much more suspicion, much more red tape and are especially restrained in their initiative.

Let the government rid itself of its purely industrial tasks. Let it concentrate its attention and its efforts on its own distinctive tasks—the general administration of the nation, the defense of the country, the army and navy, its foreign representation. When it confines itself to these essential tasks, which no one else can do, perhaps it will accomplish them with less want of unanimity and inefficiency than it has done for a certain number of years.

ARE WE READY FOR INDUSTRIAL COÖPERATION?¹

BY FAIRFAX HARRISON, PRESIDENT OF THE CHICAGO, INDIANAPOLIS
& LOUISVILLE RAILWAY COMPANY.

I. THE INDUSTRIAL CONFLICT.

Conflict seems to be necessary to the human animal with red blood in his veins. It keeps him from stagnation, it develops him mentally and physically, stimulates him to invention and sustained effort; in a word, it creates in him ambition. Our whole social system, and, indeed, many of our laws, have been built upon the recognition of conflict as a natural regulative force: to illustrate from contemporary politics, we insist upon industrial competition and prohibit monopoly; the law prescribes war, not peace. For this reason the social theories and experiments, which have rested without qualification upon the principle that all men are equal, have failed; equality before the law is a great and enduring achievement of our ancestors, but equality of career is almost a contradiction in terms; the right to fight for such reward as his individual equipment and industry may earn, to take his chance of success or failure, is as much as a virile man ever asks, but he does ask that. It was the assertion of this right which precipitated the conflict, now a century old, in which our American railroad industry is still engaged, but under conditions almost reversed. It is the conflict between capital and labor which has been waged since the organization of modern industrial society, and it represents the most important phase of the railroad question today, more important than what freight rates are or are to be, more important than car supply and the volume of traffic, more important than the relation of public opinion to the railroads. It is the vital question, and on the proper solution of it, which means the substitution for the existing civil strife of some other and more economic conflict with a common competitor, depends the future of the American railway industry.

At the beginning of the nineteenth century capital was all-powerful and soon abused its power. It controlled the machinery of government and it made public opinion. The economic literature

¹ Address delivered before the State convention of the Indiana Y. M. C. A., Hammond, Ind., November 22, 1912.

of the day was all capitalistic and some of its conclusions are as revolting to us, who are engaged in industry today, as are the other extremes of the contemporary syndicalists. The pendulum soon began to swing. To secure a just recognition of its rights, both as human beings and with respect to its contribution to the success of industry, labor found and put to its service the principle of collective bargaining. It was an effective weapon. With its aid the labor unions grew in power until the conflict became an equal one. Occasionally war was necessary, but usually diplomacy was sufficient as the parties grew to respect one another, and at that moment substantial justice was probably done by both. The next stage marked a change in the balance of power, and today the condition of the railway industry in the United States illustrates a tendency to abuse of power by that one of the parties who was at first abused. He who was despised now despises. We are living in the midst of a process of steadily increasing transfer of the fruits of the railway industry from capital, which once enjoyed them, to labor; not to all labor engaged in the industry, it may be noted, but to certain powerful classes of labor. The honors of war may be said to be even; there are those on both sides who have suffered, and both parties are today faced by a common risk. It behooves both capital and labor, therefore, to find a new vent for the human appetite for conflict and to join forces for their common good.

II. THE EVIL CONSEQUENCES TO INDUSTRY OF THE EXISTING CONFLICT.

Perhaps the greatest evil of this conflict is visited actually or potentially upon the public, which is entitled to a uniform and uninterrupted conduct of the transportation facilities on which it depends more and more every year, but it is not proposed to go into that important phase of the question here. Our subject is the effect upon the parties to the conflict.

There are three recognizable consequences of this conflict which have had an evil effect upon the capital invested in railroads and as many of injurious effect upon labor. Let us examine them in turn.

Not the least element of the growing strength of labor in this conflict is that labor is today popular, in the sense in which control of political policy is accomplished in a progressive democracy by what is popular. It represents votes and is heeded by legislatures. Its attitude of conflict with the management of the railways, which represent the capital invested in them, was not the cause of the

assumption of the power of regulation of the railways by government; the managers themselves are responsible for that, but, since regulation became an accomplished fact, the activity of labor in the legislature has been the inspiration of many of the laws of unnecessary and oppressive regulation which have been enacted. I am myself an advocate of regulation of the railways by government, but I am unable to blink the fact that what we have had has not always been what we may fairly expect to have, the regulation which considers all alike. In the period of adjustment of the last few years the experience of every railway manager has been that many of the measures of regulation of railways have been futile and merely wasteful of money sorely needed for improvement of facilities which have in consequence been postponed. Many of these measures have originated in mere opportunism of the politician, who, seeking to commend himself to his constituents by adroit insistence upon minor wrongs, secures the enactment of a general law prescribing an invariable and expensive practice for the operation of all railroads, the suggestion for which had its origin in the failure of a particular railroad in respect of its handling of a particular shipment; but there are those, also, and they are not few, which have been the direct consequence of the conflict of labor and capital. The managements of the railways have not been esteemed by legislatures in recent years for historical reasons which are not creditable to either of them, and it has been as easy for organized labor as for the ambitious politician to secure the passage of a law to make a railroad wince.

But more serious than this is the effect upon the railroads of the steady demands of labor for fixed and invariable increases of wages. There is no railway manager today, I venture to assert, who does not want all his employes to be well paid, to share in prosperity when prosperity exists, and to be rewarded by promotion for efficient and loyal services. If he is not able to give this feeling expression in all deserving cases it is because his constant cost for the numerically most important classes of labor has increased in greater proportion than the increases of revenue out of which that cost must come. The margin necessary for the successful administration of any industry has been thereby progressively narrowed, until the point of danger to credit even of the most prosperous roads is now distinctly visible, as any one can testify who has railroad securities for sale which he bought ten years ago. This is a situation which would be difficult in an industry which could stand

still, but in an industry of which the life is growth, it discourages those who are invited to risk the new capital necessary to make even the improvements which, by increasing efficiency, will reduce expenses and so widen the margin again; much less will the funds be forthcoming for the improvements demanded by the public for comfort and convenience. In the end the tendency jeopardizes the very capital already invested.

Another consequence of the conflict in its effect upon capital is perhaps irrevocably accomplished already. It is the change which uncertainty of income has had upon the point of view of investors. Time was when railroad stocks were a favorite form of investment, not only because they promised substantial profit by increment of value, but because they spelled stability of income. Today railroad stocks are not in favor, and whenever money is now invested in railroads (except in extraordinary cases, each of which has its historical explanation), the form of investment is the bond. In other words, the investor is no longer a partner in the business, or, to use the good old Elizabethan word, an adventurer; but has become a money lender. He prefers the right to foreclose a mortgage to an uncertain chance of a profit secured by good management and efficient operation. The capital already invested in the original construction of a railway suffers the consequence of this change of investing opinion, for it must now stand as the margin of the new investor and must risk being wiped out for his benefit and security. Whenever, as has happened in recent years, a railroad is faced by unconcerned and unyielding demands of labor at a time when it is unable both to respond to them and to maintain its credit; this risk is imminent. It is a consequence of war.

As it concerns labor, the conflict is not less dangerous in its consequences. We hear much today of the increased cost of living. It is urged as a ground for advancing wages, even when the inability of the industry to do so and continue to prosper is apparent. The argument is that those who produce what the industry markets are entitled to the first consideration in the provision of the necessities of life, and where that argument is supported by facts it is most persuasive. It is not, however, as sound an argument in the railway industry today as it was some years ago. While the cost of certain necessities of life has indubitably increased, the scale of living of the railway employe has increased in greater ratio, and not the least factor in this has been the increases in railway wages. This is the

vicious circle of prosperity. I read the other day an old book, Robert Wallace's "Dissertation on the Numbers of Mankind," published in 1753, before the days of political economy, and there came upon a suggestive comment on this subject:

"Operose manufactures of linen, wool and silk, toys and curiosities of wood, metals or earth, elegant furniture, paintings, statues, and all the refinements of an opulent trading nation, tend," he says, "to multiply men's wants, make the most necessary and substantial things dearer and in general increase the expenses of living."

This is an eighteenth century expression of a thought which an American of our time, who represents in his own life the success of individual initiative, industry and economy, has well phrased in the notable epigram that "It is not the high cost of living from which we suffer but the cost of high living." There is many an American railway employe who, if he searches his heart, will admit that the large increases in wages which have been secured for him in recent years have brought him very little real comfort. I was talking the other day with a locomotive engineer who was thirty-five years old and has drawn handsome pay for most of his industrial life. He told me that his father, who had been a runner on the same road, had saved and left behind him \$6,000, living meanwhile a self-respecting life on very much less wages than his son now gets. "Not only have I been unable to save anything," said the son to me, "but I have spent some of the old man's savings."

"What did you do with your last increase in pay?" I asked.

"Well, my wife said that the neighbors thought she should have a silk dress, and the girls wanted a piano, and so it went; in the end I did not find myself any better off than I was before."

This means, if it means anything, that the present position of labor in its conflict with capital is deemed to justify the expectation of continued increases in pay without regard to industrial conditions, an assurance which breeds habits of extravagance which are harmful to the individual. In other words, the increased pay is a factor in creating the high cost of living.

As the conflict is now waged, the lion's share goes to the most powerful organization, and the weak among the employes alone suffer. It is an indisputable fact that some classes of railway employes are now highly paid, both actually and relatively, and that other classes are not on the same basis in proportion to the value of their services. This is an inequality in the same industry which one

can understand is intolerable to a spirited man, and indeed produces some of the worst consequences of the present system, both upon the employer and employe, but chiefly upon the latter.

Finally, the present system which required in the beginning a well disciplined and cohesive organization for self protection, now results sometimes in stifling the ambition of the individual by an assurance of drab uniformity of treatment. It is not necessary to press the point. The warmest advocates of conservatively managed labor unions, and I am proud to include myself in the number, recognize the danger and the risk of this necessity of the system.

What, then, of the future, if the present conflict continues?

For the management of industry the conflict has been a stimulus to greater efficiency and the economical investment of new capital. As the wages of labor increased, an attempt to offset the increased expense by economy in operation has resulted, and vast sums have been spent, for example, in reducing grades and increasing power, to secure greater unit train loads, but the limit to this kind of economy is in sight, if it has not been reached. The candid fact is that, although other branches of industry are at this moment enjoying great prosperity, the railroads, doing the largest business in their history and passing through their treasuries the largest revenues they have ever realized, are in a more precarious condition than ever they have been, such is the burden of their expenses. It is absolutely necessary to the railroads that something shall be done to relieve the present tense situation and enable them to face the future with confidence, and I believe that the way to accomplish this is to settle the conflict of labor and capital in the railway industry on an enduring basis. Other remedies are mere salves on that sore.

For labor, also, the future is not assured under existing conditions. Already there have been expressions of discontent on the part of other classes of the community with what they call the preferred position of railroad labor. The most industrious and successful farmers and storekeepers in the country along the line seldom make as much net money in the year as do the railway employes stationed at those towns, and nothing like as much as those they see going by on the trains. They are, however, a large numerical majority of those who pay freight charges, and they now complain against the freight rates largely because they think these rates might be less if such relatively high wages were not paid to certain classes of railroad employes. If that class of the community speaks it is likely

to be heard in the legislatures more sympathetically than the railroad managements are heard. All it lacks at the moment is organization and this it can learn from the successful experience of labor.

This brings us to the next point.

Whenever any class of society becomes so powerful as in the abuse of its power to affect injuriously the lives, liberty or the pursuit of happiness of or by any other considerable class or classes of society, the consequence, under the existing régime, is for government to lay the heavy hand of regulating authority upon it. This may happen sooner or later, but it is inevitable. Eighteen months ago, in a public address, reasoning from the same premises, I ventured to predict that the public press could not escape such legislation; and we find today an act of Congress regulating newspapers on the statute books. It is not impossible that organized labor may hereafter be faced with a strong and sustained public control of its activities. It would be the logic of the last phase of the present conflict.

III. THE REMEDY: INDUSTRIAL COÖPERATION.

It is interesting, and perhaps instructive, to think out these things, but it serves little purpose unless it leads to the suggestion of a remedy. We cannot stand still, for "stand pat" policies are not popular at the moment and only serve to prolong the conflict. We cannot revert to the former conditions: the old arguments which convinced men a generation ago may still be listened to respectfully, but they are no longer heeded. We must progress.

The most tragic intellectual life of the last generation was that of the English philosopher, Herbert Spencer. About the middle of the nineteenth century he began the compilation of a synthetic system of philosophy based upon the opinions of that time, and, with extraordinary persistence, learning and intellectual vigor, he labored on, despite physical handicaps, until he completed his self-appointed task in 1896. It was an achievement which, in a previous century, might have had enduring effect upon the opinions of mankind, but while he was writing the world was moving with an increasing velocity, and the opinions which actuated men's political and social life in 1896 were utterly different from those of 1850. His work of a lifetime was out of date before it was complete, and the tragedy is that he saw this. Yet he had the vision of a seer into the future. His last word was a sturdy maintenance of his belief that in 1850 there was reached in England "a degree of individual freedom

greater than ever before existed since nations began to be formed," and that this was the highest state to which man could attain, but he had observed the reaction against too much individual liberty and the abuses which it bred, and marked the growing tale of statutes by which the government was given authority to interfere with the daily life of the citizen; in other words, he foresaw the growth of regulation which is now a rooted policy of statesmanship, and he saw that this principle must continue to expand until the government controlled and operated all the industries in which the individual citizen is employed; the only alternative was a compromise, on which the conflicting forces of society, capital and labor, might provide for the continuance of private initiative in industrial opportunity. Dreading socialism, Herbert Spencer found this refuge in industrial coöperation.

This economic principle has found many expressions. Under it labor and capital have united in the ownership of a business and have failed. Under it labor has attempted to dispense with invested capital and do business on the aggregate credit of a number of individuals: in what we call merchandizing, and the economists call distribution, as in money lending, success has been accomplished through coöperation, but in the coöperation of production, such as manufacturing, there has been failure for lack of the capital necessary to carry the business over times of stress. Capital itself, represented by conscientious and enlightened men, has from time to time sought to apply the principle of coöperation to industry in the form of profit sharing; here again there has been little real success in accomplishing the prime object, which was an identification of interest between capital and labor, because even the best laid plans of profit sharing have been regarded as a sort of tea table distribution of cake among men who work for bread. The dole is often accepted with a sneer.

I do not now propose any of these forms of coöperation for the railway industry, but one which seeks their object and attempts to avoid the causes of their failure. At the moment, that industry is in a precarious condition, everyone engaged in it has his stake at risk. In order to identify and coördinate all the interests involved, and to secure the success which is not only possible but almost inevitable if that result is attained, all must share in the results of the business according to the fluctuation of the industrial barometer: the spur must be the expectation of loss sharing as well as profit sharing.

Specifically, I propose, therefore, that a railway wage schedule shall be prepared as follows:

Calculate on experience what has been the percentage of the total pay roll of all classes of employes to the operating revenue in a given year or average series of years, and apply this percentage to current operating revenues to fix thereby the appropriation for pay of employes. The total appropriation, so made, would then be distributed among the several classes of employes in the percentages of their participation in the pay roll which was taken as the standard, and the individual would share in the appropriation for his class according to his services measured by agreed units.

Under this meter wages would increase automatically as revenues increased, but would decrease automatically as revenues decreased. The prosperity of the individual would be that of the road. Capital, controlling management, would alone be interested in expenses, as now: labor's interest would be in increasing revenue, or what has been heretofore called gross earnings.

While there are many details which would have to be worked out to make this suggestion practically effective, the beneficial consequences of the acceptance of its principle might be far reaching.

The railroad industry would be a united industry: there would be a common interest between employer and employe. The intelligence and energy which is now devoted to the effort, on the one hand, to get wages increased, and, on the other, to resist increases, might be expected to be applied to promoting the industry itself. The result would soon be reflected, not only in the income account, but in the statute book. If rates were too low to yield a fair wage to all, as well as a fair return to capital, there would be a united demand for their readjustment, which would have the backing of votes as well as argument. The human lust for conflict would find its expression as between railroad and railroad: officer and employe would have a common loyalty, and the healthiest kind of competition would be promoted, that of efficient service. The individual would control his household expenses and would follow the expansion and depression of trade with his own economies: he would indeed be in business, a true unit in the current industrial life of the nation, rather than the beneficiary of the plunder of a successful war.

This is the purpose of industrial coöperation.

Is it not worth considering ways and means to bring it about?

THE QUESTION OF COMPULSORY ARBITRATION IN THE RAILWAY SERVICE.

BEFORE THE "SOCIÉTÉ D'ÉTUDES LÉGISLATIVES," OF PARIS, BY MARCEL PESCHAUD, FORMER AUDITOR TO THE COUNCIL OF STATE OF FRANCE, SECRETARY OF THE PARIS-ORLEANS RAILWAY.

(From the Bulletin of the International Railway Congress.)

A certain school of politicians recommends compulsory arbitration for the settlement of disputes between the employers and employes. This system has in particular been proposed in order to do away with strikes on railways.

About two months after the strike which took place on the French railways, on December 22, 1910, Mr. Briand, the minister, brought before the Chamber of Deputies a bill concerning the law affecting the employes of the main railroads and concerning the pacific settlement of collective disputes relating to the professional interests of those employes. *Inter alia*, this bill provided for the creation of a central conciliation board to which any disputes of a collective character, existing between the employes and the administration of a railway, had to be submitted, if these disputes could not be settled by the local committees or commissions which were to be created under the bill; also for compulsory arbitration if the central conciliation board did not succeed in inducing the parties to agree. The principle of compulsory arbitration for the settlement of labor conflicts on main railroads was thus laid down in this bill.

The question is serious enough to give rise to thorough discussion. We cannot here mention all the articles and papers concerning this subject, which have appeared in the reviews and in the newspapers; we limit ourselves to the analysis of the discussion of this question at the *Société d'Études Législatives* of Paris, whose work, with justice, is considered authoritative. This discussion forms, in consequence both of the eminence of those who took part in it, and of the importance of the arguments advanced, an important contribution to the study of the question of compulsory arbitration, in so far as railways are concerned.

In order to obtain a basis for this discussion, the Société appointed a commission. This commission worked out a project for a law, and entrusted one of its members with the duty of drawing up a report stating the conditions affecting the question and the principles

on which it was based. We now proceed to give a short summary of this interesting report.

After drawing attention to the evil of strikes, in particular in the case of a public service, such as that of the railways, the report of the commission considers that it would be desirable to find means for preventing strikes. It concludes, with justice, that the liberty of the party working the railway is limited by its tariff conditions and by the very nature of the service which it is bound to give, and that it accordingly cannot resort to lockouts, the counterpart of strikes; and that the greatest losses are not incurred by the two parties disputing, but by the public, which needs the service.

But how is the stoppage of work to be prevented? Two methods are possible, according as repressive or preventive measures are adopted.

The repressive method has been adopted in some countries.

In Russia, a ukase of 2/15 December, 1905, inflicts severe punishments in case of strikes in the state services on the railways.

In Holland, the act of April 11, 1903, prohibits and punishes strikes on the main railroads.¹

¹ The list of countries where railway strikes are practically prohibited seems to require additions.

In Germany there is no written law, but very clear declarations of the government show that railway strikes are looked upon as prohibited in the different states forming the empire. In Prussia, Mr. von Breitenbach, the railway minister, expressly stated during the discussion of the 1911-1912 budget: "With us, the legal position is clear and not doubtful. . . . The government and the railway administration act legally in considering any strike of the railway servants to be inadmissible and unauthorized." A similar declaration was made by the finance minister of Saxony during a recent parliamentary debate: "Any possibility of a strike of railway servants must be absolutely prevented in the general interest. . . ." Recalling the attitude of the French government during the 1910 strike, he added: "The government of Saxony will act, in this respect, on the same principles, with the difference that it does not intend to wait till the strike has been declared."

In Austria, as in Germany, the use of the right to strike is, in practice, made impossible as regards the employees of railways, of the post-office and of similar services, by the way in which the authorities oppose the promotion of unions among those employees. The authorities base the measures they take with this object, on the presumption that the fact of belonging to a militant union is incompatible with fidelity to the service and with the security of the state.

In Belgium, there is also no law prohibiting any strikes of railway servants, but declarations made by the government show very clearly that no such strike would be tolerated. The railway minister clearly declared this during the discussion of the 1908 budget, and the Chamber of depu-

In the United States of North America, two states, namely, Delaware and Maine, punish strikes in the public services.

An English law, of August 13, 1875, imposes penalties in cases of stoppage of work in gasworks and waterworks.

As against this legislation, the report draws attention to the fact that, on the one hand, the prohibition of forming unions must equally involve the prohibition of the right of forming any societies or associations; on the other hand, that it would not be easy to draw up the list of public services in which strikes should be made punishable; finally, that it would be impossible to apply repressive legislation to a body of 300,000 employes who simultaneously ceased work, and that the penalties imposed on them would be much less effective than the exercise of the right of dismissal.

The preventive methods differ in the different countries.

Various states have contented themselves with compelling the employes of the public service to give notice, a week or two in advance; they are prohibited from leaving work before that period has expired. The New Zealand legislation (act of October 10, 1908), that of Spain (act of April 27, 1909), and that of Portugal (act of 1910), are of this kind. Several weeks after that act had been passed a very violent railway strike broke out in Portugal, and the

ties accepted his declaration by passing the following resolution: "The Chamber, without admitting that the employes of the railway, postoffice and telegraph services have the right of interfering with such important public services, by going on strike, takes note of the declaration of the railway minister, that he recognizes the right of the employes to form unions within the limits compatible with the necessity of preserving order and discipline." Similar declarations were made by the railway minister during the discussion of a recent question in the Chamber of representatives (March, 1912).

In Italy, an act of 7 July, 1905, prescribes that: "All the employes of the railways operated by the State, whatever their grade and whatever their duties, are considered to be public servants. Without prejudice to any penal action provided by the statutes in force, those who voluntarily leave their work, or who carry out their work in such a way as to interrupt or disturb the continuity of the regularity of the service, shall be considered dismissed and shall be replaced. The general manager may however, on the recommendation of the administrative council, and taking into consideration the individual conditions and the personal responsibilities, substitute suspension of service, postponement of any rise in pay or allowances, or reduction in rank."

In Switzerland, article 202 of the military law of 12 April, 1907, places the employes of the public transport services in the same category as the soldiers. The interpretation of this article is that it is impossible for such employes to strike.

In Roumania, a decree of 1 January, 1910, prohibits, in an absolute manner, strikes in all the services which are declared to be of public utility, whether governmental or local.

employees did not trouble to give notice; and this enables us to estimate the value of the system.²

In other countries, attempts have been made to solve the problem by creating conciliation and arbitration boards.

The report continues that conciliation is accepted more willingly than arbitration, and gives two reasons which in the commission's opinion decide the matter in favor of the latter system. The first is that the experience of England and Canada makes it possible to consider it an effective way of settling conflicts peacefully; the second is that this is the only practical system that has yet been proposed to settle collective disputes, by other means than strikes. Arbitration would have two advantages. In the first place, it would very materially reduce the number of strikes; secondly, it would invest the government with the moral authority necessary for fighting against the strikes which would occur in spite of everything, by giving it the certainty that the workmen's demands, examined by an impartial authority, had been satisfied in so far as they were well founded.

Among the legislation which provides for a possible recourse to conciliatory measures, there is the French act of September 27, 1892, which is a law of a general character. The right of initiating the conciliatory procedure is vested in either of the parties concerned, and in the justice of the peace; the conciliation board consists of representatives of the two parties, and the justice of the peace acts as president. The report recognizes that the results of this law have been very mediocre. In all the strikes which took place from 1893 to 1909, recourse was had to this law in only 22 per cent of the cases. The conciliation board was only formed in 14 per cent of the cases, and in only 10 per cent of the cases did conciliation prove to be a success.

Based on the same ideas, an English act of August 7, 1896, gives, on the one hand, a legal status to conciliation boards which exist or are going to be formed; on the other hand, it gives power to the Board of Trade to intervene, when it thinks this advisable, in order to try to bring about conciliation between the parties. In 1910, there were 282 sectional boards in existence; they have settled a large number of disputes. As for the intervention of the Board of Trade, this has taken place more and more frequently, and on Oc-

² During the recent strike of railway servants in Spain, the duty of giving notice was disregarded to very nearly the same extent.

tober 10, 1911, that board substituted an industrial council, consisting of thirteen members representing the masters, thirteen members representing the men, and a president, Sir George Asquith, controller general of the Labor Department.

In Germany, the court of arbiters has the right to form itself, at the request of the parties concerned, into conciliation boards for settling labor disputes.

In the United States, permanent and optional conciliation boards have been instituted by rather numerous laws made in the different states, but they have done very little.

In Sweden, an act of December 31, 1906, has appointed a special official to act as conciliator in any labor conflicts other than those connected with industries in which special conciliation and arbitration boards exist.

As regards compulsory arbitration, it was in Australia that this was first tried and developed. It made its appearance in New Zealand in the act of June 2, 1886, subsequently modified by the acts of October 27, 1905, October 31, 1905, and October 29, 1906. Arbitration is compulsory in the disputes affecting trades in which the masters or the men have formed registered unions which have a civil status. These disputes are in the first place brought before mixed conciliation boards formed of representatives of the masters' and the men's unions; if no agreement is arrived at, they are then decided, without appeal, by a supreme arbitration court consisting of three members, of whom one is appointed by the masters' union, one by the men's union and the third by government. A similar system was adopted by Western Australia (acts of December 5, 1900, and of February 19, 1902) and by New South Wales (act of December 10, 1901).

Without attempting to decide the question whether this legislation has given favorable results or not, the report recognizes that it is difficult to draw any conclusions, applicable to our country, from the Australian experiments, for the economic conditions there are very different.

In Europe, compulsory arbitration, in private industries, exists in the canton of Geneva (act of March 26, 1904, inspired by the Australian legislation) and in Denmark.³

³ According to the text of the Danish act of 12 April, 1910, the arbitration boards have the power of imposing penalties and of enforcing them if agreements are disregarded.

The report then considers, more especially, the question of conciliation and arbitration in the public services. It first quotes several acts providing for an optional recourse to conciliation and arbitration, under conditions similar to those described in connection with private industries. Some of these acts concern railways. They include the following: In Canada, the Quebec Act of March 28, 1901, and the Ontario Act of May 14, 1906; in the United States the Federal Acts of October 1, 1888 and of June 1, 1898 (these laws have had but little effect).

Among the laws of this kind, one may mention, in France, the act of July 22, 1909, creating a permanent arbitration board in connection with shipping.⁴

Compulsory recourse to conciliation is imposed in a Turkish act of July 25, 1909, in the case of the public services.

Finally, compulsory recourse to arbitration exists in three countries, namely, to Holland, Canada and England.

In Holland, after the railway strike, a decree of 1903 compelled the companies, as a set-off against the law taking away from the railway servants the right to strike, to submit for ministerial approval the working rules of an arbitration court for settling disputes "in case of disciplinary penalties and with every reserve as regards the safety of the service."

In Canada, two federal acts were passed to organize arbitration. The first, of July 10, 1903, which only concerned railways, is no longer applied since the passing of the act of March 22, 1907, which is generally known as the Lemieux Act, and applies to all the public services. The importance of the scope of this act is shown by the fact that the number of disputes in the industries to which it applies represents 14 per cent of the total number of disputes which occurred in Canada from 1900 to 1906, and that these disputes affected 43 per cent of the men who went on strike during that period.

The system of the Lemieux Act is as follows: If a conflict is imminent, a board of conciliation and inquiry is called, either by one of the parties concerned, or by the labor minister, to settle the dispute. The board consists of three members, two being appointed, respectively, by each of the parties concerned, and the third by the labor minister, if the parties fail to agree. After the board has ex-

⁴ This has proved an utter failure. The parties concerned have refrained from appointing representatives; hence when a strike occurred last July, it was impossible to settle the dispute by the permanent board which should have been formed under that act.

amined the causes of the dispute and worked out a conciliation scheme, the board recommends a given solution, and depends for its execution on the wisdom of the parties concerned and on the pressure of public opinion. Severe penalties are provided, in the act, if any strike takes place before this procedure has been completed.

According to the report, the results obtained have been as follows: Since the coming into force of this act, there have only been 17 strikes in the industries affected, as against 315 in the whole of Canada. Of the disputes brought before the conciliation boards, 50 per cent were settled by the boards, 20 per cent were settled by the parties concerned accepting the recommendations of the boards, 12 per cent in the same way, but after a strike of several days; in 18 per cent of the cases, procedure did not result in conciliation. Since the coming into force of the Lemieux Act, there have been only two railway strikes of any importance, one on the Canadian Pacific, the other on the Grand Trunk.

As regards England, the report discusses the agitation which threatened in 1907 to result in a railway strike, and the conditions under which this strike was prevented, thanks to an agreement dated November 6, 1907, to remain in force six years, which was made between the companies and their servants, thanks to the intervention of Mr. Lloyd George. According to the terms of this agreement, any dispute concerning the pay and the hours of labor was in the first instance submitted to sectional conciliation boards formed by representatives of the masters and of the men; should no agreement be arrived at, the dispute was then brought before central boards formed in the same manner. If no agreement resulted, compulsory arbitration took place; this was binding on both parties. The arbitrator was to be appointed by the speaker of the House of Commons, or by the master of rolls. The 1907 agreement applied to forty-six railway companies and to 97 per cent of the railway servants.

The railway servants had accepted this agreement with satisfaction; but the unions at once began to attack it more and more violently. On August 17, 1911, joining the strike movement of the dock laborers and the carriers, they demanded that the companies should treat with the representatives of the unions, direct, within twenty-four hours. Although the companies would have accepted the appointment of a royal commission, proposed by the government,

which would have inquired into the working of the conciliation boards, the unions declared a strike on the 18th of August. More than 200,000 railway servants went on strike; but on the 19th of August they decided to accept the terms of an agreement signed by their representatives, by the representatives of the companies, and by Messrs. Asquith and Lloyd George in the name of the government. This agreement provided for the appointment of a commission of inquiry into the working of the system adopted in 1907. This commission, after a long inquiry, modified certain points in connection with the 1907 system, but maintained its principle. Its conclusions were received by the unions with dissatisfaction.

After an analysis of a criticism of the bill proposed by Mr. Briand, the commission sets forth in its report the bases of its project, which has four chief features: (1) Regular meetings between the heads of the departments and the central administration of the railway system, on the one hand, and the delegates elected by the railway servants, on the other: (2) in case of any dispute about the conditions of work, recourse to compulsory arbitration if one of the parties or the minister of public works demands it; (3) the absence of penalties if the decision of the arbitration court is not carried out; (4) the promise of compensation, in certain cases, to the administration of the railway affected by the arbitration.

This noteworthy report, of which we are only able to give a brief summary, served as basis for a very interesting discussion.

Mr. Jay, professor of laws, at Paris, doubted whether the proposals of the commission could have the happy results the latter expected.

Conciliation and arbitration could only lead to the peaceful settlement of disputes if those institutions were organized in such a way as to lead to a direct meeting between the representatives of the masters and the representatives of the unions. That conciliation had had happy results in England, was due to the professional conciliation boards which were based upon this principle, and formed a species of mixed commissions consisting both of masters and of men. The same was the case in Canada, where the workpeople were nearly always represented by unions. Mr. Jay stated that it was chiefly for this reason that he was unable to support the project of the commission.

Mr. Georges Cahen, member of the Council of State, replied to this criticism by remarking that it did not seem possible to the com-

mission to accept Mr. Jay's views, which would have the result of making unions compulsory, and of considering the unions as representing the whole of the employes, whereas as a matter of fact they at present represented only a minority. It seemed to him better that the representatives of the men, who were to meet the officials, should be delegates elected by the whole of the men.

The project of the commission was also opposed by Mr. Heurteau, delegate-general of the management of the Orleans Railway. Leaving out of consideration the serious objections to the principles which the project appeared to him to set up, he looked at the matter above all from the practical point of view. His great experience of railway work invests his remarks about this subject, with much authority.

As far as conciliation was concerned, he stated that he agreed with the commission in the main ideas it had taken as basis. He approved the basis of the scheme, namely, the institution of delegates elected by the men, under conditions similar to those which had been jointly agreed to, by Mr. Millerand, then minister of the public works, and the great railway companies of France, in the beginning of 1910.

The fundamental ideas on which this agreement was based were, on the one hand, the recognition of the utility of establishing direct and frequent relations between the heads of the different departments and the men working under them; and, on the other, the need of giving these relations the character of confidential and familiar conversations, free from formality, and above all to arrange matters, so that every delegate should, as far as possible, have personal knowledge of the questions he had to consider, and that he should be directly interested in them. It was in fact impossible to consider the work of being a railway employe as forming one single class of work; the railway servants really performed very different classes of work; there were switchmen, locomotive drivers, trainmen, station employes, men in the workshops, etc. These were all different classes. A locomotive driver, or the secretary of a union, who had formerly been a locomotive driver, would be absolutely incompetent to deal with a question relating to station work, and vice versa. Now, nothing seemed more dangerous than the intervention of delegates who were not personally interested in the questions which they were discussing, who only had second-hand knowledge of them, and who hence acted more as pleaders, who held a brief.

With delegates of this kind, who had received definite instructions, it would generally be impossible to come to an agreement.

The organization instituted by the great French companies was as follows: The employes or workmen having similar functions or conditions of work were formed into groups, of each class in each district; each group so formed, elected a delegate who was periodically called upon to meet the head of the corresponding local service.

Thus, on the Orleans Railway, there were nearly nine hundred delegates elected by the men engaged in the three chief departments (traffic, locomotives and rolling stock, permanent way), divided into professional and local groups as already explained (trainmen of such and such a station, locomotive men of such and such a locomotive shed, etc.). Each of them was entitled to meet the head of the district service concerned once every three months. Actually meetings took place more frequently, for the chiefs of the departments, and even the general manager, when they passed through a station, took advantage of this opportunity to summon the delegates, to inquire what they desired, or to give them messages for their comrades. This did not prevent these delegates from interviewing the manager, either individually or in a body, like all the employes of the company, and they made an extensive use of this option.

In principle, it was the function of the delegates to bring before the heads the observations and the desires of their comrades, relating to the organization of the work. In fact, the requests presented by them were chiefly of practical interest, such as the arrangement of the working places, the organization of the service, etc. Most of them were of a local character; it was only exceptional that the requests were of a more general character.

This system, organized in this way, hence could not be considered a first step towards a system of compulsory arbitration; it simply helped to adjust the relations established between the administration and the men, by facilitating the examinations of their wishes and by deciding questions of a practical character which might be brought forward. As a matter of fact, it gave good results on the Orleans Railway. That less satisfactory results were obtained on other railways was due to the hostility of the unions.

Whatever might be the advantages of the system of delegates of the men, such as had been organized on the French railways, Mr.

Heurteau disagreed with the commission of the Société d'Études Législatives, as he thought legislation on the subject was unnecessary.

The legislative measures proposed would be superfluous as regards the companies, who have all accepted this institution in principle. They would, on the other hand, be ineffective as far as the unions were concerned, as the latter opposed them.

Mr. Heurteau was also unable to agree with another article in the project of the commission, namely, that which specified that the delegates should have periodical meetings not only with the heads of the district services, but also with the central administration. In his opinion, that would have more disadvantages than advantages. How could one organize periodic meetings between the 873 delegates of the Orleans Railway and the central administration? Should they themselves appoint delegates of a higher degree? In this way, one would arrive at conciliation boards similar to those against which the commission had decided.

Mr. Heurteau, moreover, was of opinion that the commission was right in deciding against this institution. Besides, it was difficult to see how a board of this kind could be formed in such a way as to have full competence in the case of all questions which might be brought before it. A board organized as proposed by Mr. Millerand in the report he had drawn up on Mr. Briand's proposal would have a permanent character; it would have as president a government engineer and a report of its proceedings would be published in the *Journal Officiel*; it would only have fully-fledged difficulties brought before it which would already be of the nature of disputes. Thus such a board would form a first court of arbitration, rather than a conciliatory body. As supply begets demand, so a board of this kind would be more likely to give rise to disputes than to allay them.

In answering Mr. Jay's criticism, who wished that the unions should be considered as representing the whole of the men, Mr. Heurteau expressed the opinion that the true principles which should regulate the intervention of the unions were laid down in the arbitration judgment given by Waldeck-Rousseau, in 1899, in connection with the Creusot strike. In it it was stated that the intermediacy of the union could be utilized with advantage in certain cases if both parties agreed to this; but it could not be made compulsory. As a matter of fact, the belligerent union of the workmen and

laborers of the French railways, which was affiliated to the Confédération Générale du Travail, only represented a small proportion of the employes; hence it might be an instrument of war, but not an instrument of peace. It was impossible to think that it could be useful as an intermediary.

As for compulsory arbitration, Mr. Heurteau wholly disagreed with the commission. We have seen that according to the reporter, recourse to arbitration was justified above all by the good results which this system had given in England and in Canada. These results were carefully examined by Mr. Heurteau.

In Canada, according to the figures quoted in the report, the conciliation and arbitration board could only definitely settle 50 per cent of the disputes which were submitted to the procedure instituted by the Lemieux Act. In the other cases, negotiations had to be started after the arbitration, in order to arrive at an agreement. In 18 per cent of the cases the procedure gave no result. Moreover, in the matter of strikes, it is chiefly the number of the strikers which has to be considered. Now, in 1908, after arbitration had taken place, there was a serious strike on the Canadian Pacific, which lasted for two months. In 1910, on the Grand Trunk, there was a strike affecting a large number of employes, and this also lasted nearly two months. These strikes, which occurred at the period when there was most traffic, had a very serious effect on the economic life of the country. Moreover, in both cases, the strikes arose because the employes refused to accept the decisions of the arbitrators. Besides, as a matter of fact, the arbitrators in Canada act less as judges of the disputes than as conciliators.

This was how Mr. Shortt, who presided at many arbitration boards, explained the working of the law:

"We lay as little stress as possible on the compulsory character of the inquiry. Once the board is constituted, we proceed without useless formalities; I have never had the witness sworn; I have never required books to be produced; the best method is to take the employer aside, and ask him in a friendly way what I wish to know. The press is as a rule excluded at these meetings. As there is no question of an action-at-law, but one of a series of discussions in which it is important, for both parties, to be able to withdraw irreconcilable statements, a full report of the discussions might imperil settlement; moreover, the presence of newspaper reporters would lead the opponents to address themselves to the

gallery. Under these conditions, the men and the masters do not hesitate to speak openly, and the discussion proceeds quickly.

“Finally, we take care to keep within the limits prescribed by the act. Once the inquiry is terminated, all we have legally to do is to present our report. It is then, on the other hand, that the most delicate part of the negotiations begins. A good method of accelerating settlement consists in taking each party aside and talking the matter over privately first with the master and then with the man, or in asking them to come to an agreement themselves over some technical point which one informs them one does not understand. We have also in some cases adjourned the proceedings for some time in order to give the opponents time to think over their case; we generally find them more conciliatory when the discussion is resumed.”

And the author concludes with the statement:

“The tact of the Canadian administrators has thus, in practice, converted a compulsory inquiry into a freely-accepted inquiry.”

Thus in Canada, it was much more a question of conciliation than of arbitration. Nor must it be forgotten that in Canada the two parties were on a footing of equality; either was free to accept the suggestions of the conciliation board. The railway companies are in fact free to declare a lockout.

In England there was no compulsory arbitration. The organization which was instituted in 1907 resulted in fact from an agreement accepted by the representatives of the companies and by those of their servants. On the other hand, the decisions of the arbitrations held in virtue of this agreement had no absolutely compulsory character at first, but would have now according to the decisions of the mixed commission appointed after the last strike. This organization had made it possible to settle a certain number of questions of very little importance, but the unions still remained hostile to it, as they, although they only included 17 per cent of the employes, claimed that they were the only ones entitled to represent the whole of the employes. Although it had been stipulated, in the 1907 agreement, that this was to hold good for six years, and that neither side could terminate it before that period, the unions suddenly broke this agreement last year and declared a strike. The mixed commission which the unions had at first refused to accept, until they had been compelled by public opinion to do so,

had upheld the 1907 agreement in its chief features. The unions began by disagreeing with its decisions, and took a referendum with a view to the continuation of the strike. The results of that referendum had not been made public, but it was known that they had been in favor of the strike. Public opinion became excited, and the government compelled the unions to accept the decisions of the mixed commission, in all essential points; a new commission was then appointed which modified in certain details the decision of the first commission. The leaders of the unions ended by accepting the latter proposals, but not without opposition from their members. All this led to the conclusion that the arbitration system instituted in England was unable to prevent great strikes, although it could facilitate the settlement of disputes of very little importance; that the men did not consider themselves bound by the agreements they had made and that the latter had no validity; that they broke these agreements without any recourse to the conciliation procedure provided for in those agreements; that, having accepted the mixed commissions, they refused to accept their decisions; that the leaders of the unions, when they accepted proposals, were not obeyed by their members.

Hence one could not say that in Canada and in England conciliation boards had formed an effective means for the peaceful settlement of labor conflicts. If the arbitration procedure instituted in Canada were instituted in France, the administrations of the railways would not be on an equal footing with their servants, as they are in Canada, for they cannot declare a lockout. Taking into consideration the relations between the French companies and the government, and public opinion, the arbitration decisions would have a compulsory character for the railways, while they would have a facultative one for the employes. The arbitrators, knowing in advance that the one party was bound to submit, would try to come to a decision which the other party would accept; hence they would always give satisfaction to the men within the limits they would consider advisable to make their decision accepted, firstly, by the representatives of the men, and secondly, by the men themselves. Haggling would follow haggling and concessions would follow concessions. The agitators would thus have every advantage in promoting successive disputes and arbitrations, so that the organization proposed to prevent conflicts would be the very means for aggravating them. The remedy would be worse than the evil.

Mr. Colson, councillor of state, gave an instance in support of Mr. Heurteau's remarks. At Dunkirk an agreement had been made between the employers of labor at the port and the men, that all their disputes should be settled by arbitrators. The men had multiplied their recourse to arbitration; at each arbitration they had obtained something, with the result that the cost of handling goods at Dunkirk had increased to such an extent that many merchants did all they could to avoid that port. The result was that after a period of marked progress, the trade at that port had become stationary or had even gone back.

After giving this instance in support of the argument brought forward by Mr. Heurteau, Mr. Colson mentioned other objections to the project of the commission, objections of a legal character.

The first was the want of any authority.⁴ It was said that public opinion would act as authority; then it would be necessary that it exercised the same influence on the two parties. As a matter of fact, experience showed that the decisions of arbitrators were always binding, as regarded the masters, while as regarded the men, they frequently refused to accept them, even if their leaders thought they ought to accept them.

The second was that the proposed legislation would constitute an exceptional law, applying to one class of occupation only. That would be a very dangerous proceeding. By making exceptional laws, to settle a dispute, as had been done in England, one destroyed the principles of right and wrong in people's minds, and one developed the conception that the only right which existed was the right of might. Could it be asserted that the carriers' business was in an exceptional position because its stoppage results in a public calamity that no private initiative can remedy? But there were many other industries in a similar position and therefore it was general legislation, applicable to all those industries, which was wanted. Only, in order to be justified, this special legislation should include, as its first principle, the prohibition of strikes. This pro-

⁴ The same idea has been recently expressed by Messrs. Asquith and Lloyd George. Mr. Asquith, in replying to a deputation from the British chambers of commerce, declared that he was formally opposed to the principle of compulsory arbitration. He added, that in order to solve the problem of conciliation between masters and men, it was an indispensable condition that the solution should meet with the approval both of the masters and the men. Mr. Lloyd George, during a recent debate in the House of Commons, stated that if one wanted to go beyond conciliation, if compulsory arbitration were to be adopted, that arbitration would have to be compulsory as regards all parties concerned.

hibition would, moreover, only be a general application of the principle that the exercise of the rights of anybody was limited by the injury this exercise could inflict on others. When the injury inflicted on third parties assumed the magnitude of a public calamity, the right to strike, like any other right, could not be invoked by a group or by an individual who had in view but his private interests.

The objection had been raised that it was impracticable to prohibit strikes, as it was impossible to prevent an offense by thousands simultaneously. That objection could be raised in many other cases, and yet it did not prove an obstacle. There were police regulations to prevent mobs from assembling in the streets. If a mob of 2,000 persons collected, it was impossible to take those 2,000 persons to the police station. But the fact that mobs were not allowed to assemble made it possible for the police to arrest some of the persons and to disperse the mob by the forces it had available. The prohibition of strikes would make the mass of the employes understand that when one asked them to strike, one asked them to do a thing they had no right to do; secondly, it would facilitate their prevention as it would put their legality out of the question; finally, and above all, it would enable the government and the masters to stop all preparation for the strike, and very probably the preventive measures would suffice to stop the strike itself.

A special system of arbitration, as far as railways were concerned, would only be justifiable if striking had been prohibited. That arbitration should, moreover, involve certain special consequences, such as the principle of compensation to the companies, namely the raising of rates, by which the public would suffer.

It would, however, perhaps be best not to make any law. Properly to protect the liberty of men who wished to work, would be worth more than any arbitration system. Such a system involved frequent elections; thus it would keep agitation alive. On the other hand, it would materially increase the cost of the public services, as had happened at Dunkirk.

Mr. Georges Cahen then replied to the previous speakers. After some personal reservations about the opportuneness of the project, he denied that the commission had any intention of proposing an exceptional law for the railways; what it wished to do, was to establish a basis for a general law. As for the objection raised against the project, that it did not make the men liable in any way if they refused to accept the decision of the arbitrator, this had

no foundation; it was forgotten that the most efficient penalty against them was dismissal. To establish any other penalties would be to declare war and to organize repression, while the project was based on the principle of pacification.

Some other remarks were made before the discussion closed.

Mr. Romieu, councillor of state, urged that in any given industry, the decision of the arbitrator cannot be made binding on one party more than on the other. On the contrary, in the case of a public service, the refusal, by the company responsible for the working of the service to the authority which had granted the concession, to accept the decision of the arbitrator, would authorize the state, if a strike ensued, to declare that concession forfeited.

Mr. Ambroise Colin, professor of laws, stated that he had voted for the provisos of the project of the commission, but that in his opinion the decisions of the arbitrators only had a moral weight; if it were a question of any direct or indirect penalties, and not of moral influence, he would have considered that the project went too far and would not have voted for it.

Mr. Heurteau, in support of the answer made by Mr. Colson to this objection; that it would be useless to make striking penal, as it would be impossible to prevent it if a large number of employes went on strike simultaneously, drew attention to what happened in 1910 when there was a strike on French railways. Military mobilization was resorted to. If the employes had not obeyed the mobilization order, it would have been just as difficult to court-martial several thousand men as it would have been to prosecute several thousand employes for going on strike. But the respect for the law and the fear of penal consequences led the large majority of the employes to obey the mobilization order. Mr. Heurteau shared Mr. Colson's opinion, with regard to the conclusion he had arrived at. It would be best to make no new law. The best measure for preventing strikes would be to make it definitely understood that any employes leaving their posts would be dismissed, and that their dismissal would be final, without hope of reinstatement.

Mr. Cauwès, senior member of the faculty of laws, Paris, stated that although he was in favor of intervention, his interventionism had limits. He thought that in all cases where a public service was concerned, strikes were not permissible; a strike was an offense, which should be punished.

Mr. Rau, practising at the court of cassation, did not think that legislation which made strikes penal would prove ineffective. As regards punishments, if it was desired to carry out a law, it was possible to do so.

As the regulations of the Société do not allow voting, this very interesting discussion, of which we were unable to give more than a short summary, then terminated without the taking of any vote; but the remarks made showed that the opinion of the great majority was against the project proposed. For in order to give expression to this feeling, it was decided to close the discussion, intimating that the discussion, although not completed, would not be resumed.

THE AVERAGE PAY OF GERMAN RAILWAY SERVANTS.

BY PROF. LOTZ, OF MUNICH.¹

Source of information here considered: Statistics of the German railways now in operation compiled from the reports of the Administration of Railways in the offices of the Reichs-Eisenbahn, Vol. 31, year 1910, published in Berlin, 1912 (Königliche Hofbuchhandlung und Hofdruckerei, E. S. Mittler & Sohn, Berlin, Kochstrasse 68-71). The data are, however, lacking in clearness for our purpose and must be used with reservations.

In Table No. 22 are given the receipts and cost of operation for the year 1910, with a division of the latter into *Expenses for Personnel* and *Expenses for Materials*. The following are considered as expenses for personnel:

1. Salaries, extra rent allowances paid to employes having a fixed position.....	\$130,213,426
2. Monthly or daily wages paid to employes not having a regular appointment.....	8,654,809
3. Wages to laborers working by the day or job, excepting those employed in the maintenance of the roadway and in shops.....	57,967,419
4. "Per diem" allowances, traveling expenses, moving expenses, as well as other similar extras.....	17,221,520
5. Extraordinary wages	1,196,666
6. Payments to welfare work fund and contributions	30,013,556
Total operating expenses paid to the personnel..	\$245,267,396

These figures do not, however, apply to all employes, for roadway maintenance and shop workers are omitted. How many persons come under this head it is not possible to ascertain, since in Table No. 25 the shop workers are counted in with workmen of the

¹ This paper is a translation of an article prepared for Mr. W. M. Acworth, at the suggestion of Prof. Max Bonn of Munich, who says that the writer thereof "knew more about the subject than perhaps anybody in Germany." It confirms the statements as to the German railway wages and braking appliances made in the reports of the Bureau of Railway News and Statistics for 1911 and 1912. The bureau is indebted to Mr. Acworth for Prof. Lotz's manuscript.

Zugforderungsdienstes (train switching) and in the same table the workmen of the maintenance of way service are counted in with the workmen of the Bahnbewachungsdienstes (road supervision service). One cannot calculate, therefore, from a review of these data what is the average amount allowed to each person in wages, nor how much is allowed for each person in the payments towards the "welfare" fund.

Under "Expense account for material," the pay of shop workmen and the procuring of shop materials are given as one item, viz., \$53,667,269. As the wages are here not separately given but included in the entire cost, and as the number of shopmen is nowhere clearly stated, it is evident that these data are useless for our purpose.

Table No. 25 gives the total number of persons employed and what has here been considered expenses for personnel. The heading reads: "Salaries, Daily Allowances, Wages." From this heading one may suppose that only the pay is considered, not the extras for pensions and "welfare" work. But when one compares the figures in Table No. 22 and Table No. 25, one finds inexplicable differences.

The total pay according to this table amounted to \$269,571,466 for 700,370.78 persons employed on an average, or \$384 for each individual.

It would, however, be rash to conclude from this that the average pay per person had amounted to \$384. It only represents the average cost to the administration of each individual employed. Now, the average number of persons employed is not identical with the number of persons generally employed in the course of the year. As may be seen from remark No. 1 on Table No. 25, the average number of persons employed is found by dividing the total number of days of work by 365 or 300.

It does not follow, then, that the persons who have worked less than 365 or 300 days have drawn an average of \$384, but only that such has been the cost to the administration of each individual employed.

In particular it is evident from Table No. 25 that by no means all railway servants are in fixed positions, but rather a division is

made of them on this head into different classes in the various branches of the service, which are distinguished as follows:

- A. Administration.
- B. Maintenance and supervision of way.
- C. Stations, despatching and train service.
- D. Switching and workshop.

In each department, A-D, are the following classes:

- I. Employes (beamte) holding fixed positions.
- II. Employes with a "per diem" allowance (day workers).
- III. Day laborers.

Tabulating the *average number employed* in each class of each department, we have the following:

	I.	II.	III.	I-III.
A	22,207.32	6,102.16	4,122.94	32,432.42
B	33,972.10	1,887.66	139,144.85	175,004.61
C	151,544.68	10,957.88	141,271.03	303,773.59
D	53,028.76	2,082.12	134,049.28	189,160.16
A-D	260,752.86	21,029.82	418,588.10	700,370.78

The *Expenses for Personnel*, according to Table No. 25, were in the different classes of each department as follows:

	I.	II.	III.	I-III.
A\$	21,532,757	\$ 3,595,926	\$ 1,176,912	\$ 26,305,595
B\$	13,048,458	619,820	29,565,779	43,234,057
C\$	76,329,235	4,006,789	41,240,858	121,576,882
D\$	33,398,597	909,061	44,146,179	78,453,837
A-D\$	144,309,047	\$ 9,131,596	\$ 116,129,728	\$ 269,570,371

According to the above, the cost of operation in salaries, wages, etc., for each individual employed would amount to an average in the different classes of, as far as the assumption is correct that pension and welfare expenses are not included:²

I.	II.	III.	I-III.
\$553	\$434	\$277	\$384

If the supposition is correct that in Table No. 25 under *Expenses for Personnel* the payments for welfare work are not included, then these payments must be added to the above cost.² The amounts

² But the assumption is not supported by facts, for the total of \$30,013,556 previously credited to "payments to welfare work fund and

of these payments are shown in Tables No. 26, 27 and 29, and from these tables the following sums are estimated as belonging to the expenses for personnel:

According to Table No. 26:

Employes and workmen's pensions—	
Payments to employes (beamte) and their heirs....	\$24,753,193
Payments to workmen and their heirs.....	3,969,736
Total	<u>\$28,722,929</u>

According to Table No. 27:

Care of the sick—	
Payments for physician's services in accordance with the act of insurance against sickness, as well as additional sums	\$ 2,274,296

According to Table No. 29:

Payments in accordance with employer's liability act to railway employes (beamte)	\$ 275,936
Payments in accordance with employer's liability act to railway laborers	130,183
Total	<u>\$ 406,119</u>

Payments in accordance with the accident insurance act	\$ 2,545,643
Total amount paid out for "welfare"	<u>\$33,948,987</u>

This sum does not agree with that shown in Table No. 22 as paid for the same purpose, namely, \$30,013,556. Whether the discrepancy arises because of the fact that in Table No. 22 the wages of laborers belonging to the maintenance of way department and

contributions" is distributed in working expenses under the following headings:

Cost of medical science and other medical examinations and care of officers and employes, including medicines.....	\$ 826,722
Pensions and contributions for pension fund, including compliance with accident liability law.....	20,845,538
Contributions to sick fund.....	1,411,722
Payments account invalid and old age pension law.....	188,582
Contributions to workers' pension welfare funds, not included in last preceding item.....	3,215,812
Payments account accident liability law.....	2,538,842
Other and miscellaneous.....	986,338
Total for welfare.....	<u>\$30,013,556</u>

the wages of the shopmen are counted in with "Expenses for Material," and not in "Expenses for Personnel," it is impossible to know.

EQUIPMENT OF GERMAN CARS WITH BRAKES.

According to Table No. 13: Passenger cars provided with brakes, 53,355 cars, 134,235 axles; that is, 85.83%.

Of the passenger cars of 1910, those which possess equipment for through-going brakes (air brakes):

1. Brake appliances, 129,013 car axles.
2. Only "Leitung" (hose), 10,869 car axles.

Total number of passenger coaches on hand in 1910, 57,644; ditto, axles, 156,401.

According to Table No. 14:

Number of baggage and freight cars on hand (exclusive of mail coaches), 581,780; ditto, axles, 1,190,783.

Number of baggage and freight cars equipped with brake appliances, 201,300; ditto, axles, 419,830. That is, 35.26%.

In 1910 there was equipment for air brakes, as follows: Axles of baggage and freight cars (exclusive of mail coaches):

1. Brake appliances, 48,240 axles.
2. Only "Leitung" (hose), 14,297 axles.

THE EARNINGS AND HOURS OF ENGLISH RAILWAY SERVANTS.¹

By RG.

(*Zeitung des Vereins deutscher Eisenbahnverwaltungen.*)

A report concerning the earnings and hours of labor of railway servants in 1907, which was published in February, 1912, forms the seventh volume² issued by the Board of Trade in connection with their inquiry into the conditions of labor of the work people of the United Kingdom. The information was supplied by the railway companies and the details collected were classified at the Railway Clearing House. This involved a large amount of work, which was not completed until the middle of 1911.

I.—WAGES.

The report proper, which consists of 245 folio pages, gives the average rate of wages of the different classes of railway servants in the whole of the United Kingdom, also that in the different districts and that in the different towns, the latter being classified into five groups according to size. It does not, however, give any particulars about the conditions on the individual railways. It has to be noted, to start with, that the figures given in the report do not apply to the wages paid during the whole year; but only to those paid during one week, the last pay week of October, 1907. Thus they do not allow us to draw any reliable conclusion as to the amount earned by English railway servants per year, and hence do not enable us to compare them satisfactorily with the figures published in the pay statistics of the German state railways, which apply to the whole year. Besides, the classification of the German railway servants is not the same as that adopted in England, and even where individual classes bear the same or similar names, the duties are not the same in the two countries. Another important factor which comes into play is that many of the German railway servants who have to be considered in making a comparison, are ranked as officials, and hence have many advantages (pay during illness and during holidays, free pensions, widows' and orphans' allowances, etc.) as com-

¹ From the Bulletin of the International Railway Congress.

² Report of an inquiry by the Board of Trade into the earnings and hours of labor of work people of the United Kingdom. VII: "Railway Service in 1907," London, 1912.

pared with their English colleagues, who are ranked as work people. All these factors have to be taken into consideration in making any comparison; moreover, there is the different cost of living in the United Kingdom and in Germany.

The inquiry of the Board of Trade extended to all the railway servants engaged in the different departments, except the station masters, the booking clerks and the men engaged in the construction works. It also includes the car men and dray men employed by the company for collecting and delivering goods. The report shows that the railways (electric railways excluded) employed altogether 416,238 work people during the last pay week of October, 1907. Deducting those casually employed (8,436 in number), who are not dealt with in the report, we have 407,802 work people in regular employment. Of these, 371,591 are adult workmen, 36,085 are lads and boys, and 126 are women and girls. A noteworthy fact shown in the report is that 98.5% of the male workers, namely 365,901 adults and 35,536 lads and boys, are *time workers* and only 1.5% *piece workers*. As accordingly time work is the normal practice in the services investigated, the report deals chiefly with the working conditions of time workers. Table I, which applies to the latter, is taken from the report.

All the work people included in the above table are what are known as *six-day workers*; that is to say, their wages are for work of the six work days, while Sunday work is either paid for as overtime, or an equivalent time off is allowed during the week. Besides these six-day workers, other workers are included in the figures given as totals, namely, 9,929 men and 1,856 lads and boys; most of these, namely, 5,760 men and 1,322 lads and boys, belong to the class of porters (coaching and traffic). The work people of this class are those who take Sunday duty in turn without extra pay or equivalent time off. Their average actual earnings during the recorded week were in some cases higher, in other cases lower, than those of six-day workers of their class. For instance, in the case of engine drivers their earnings were \$11.56, as against \$11.15, and in that of shunters, \$5.10, as against \$6.21; as regards porters (the majority belonged to this class), the earnings were \$4.33, as against \$4.79, in the case of men, and \$2.81, as against \$2.95, in that of lads and boys. These differences in the earnings of the two different varieties of workers depend in the first place on the difference between the weekly rates of wages, which in the different classes

are sometimes higher and sometimes lower, for either variety. They also depend on the differences existing between wages and earnings. This difference is as a rule greatest in the case of six-day workers, as these get extra pay on Sundays and consequently have more chance of overtime than the other workers. This factor is of all the more importance as Sunday overtime is paid in all cases at a higher rate (up to time and a half) than overtime on other days, which at most is paid at the rate of time and a quarter.

In the case of the six-day workers, the actual earnings, as Table No. I shows, were always greater than the average rate of wages plus bonuses; this result is due to the effect of the overtime (includ-

TABLE I.

Occupation	Number paid wages	Average actual weekly earnings.	Weekly rate of wages	
			excluding premiums.	including premiums.
Adult Workmen:				
Engine Drivers.....	26,430	\$11.15	\$9.72	\$9.78
Foremen.....	14,208	8.68	8.23	8.26
Goods Guards and Brakemen....	15,643	7.57	6.84	6.84
Passenger Guards.....	6,586	7.10	6.72	6.74
Signalmen ⁽³⁾	26,849	6.68	5.99	6.15
Firemen.....	26,029	6.66	5.76	5.78
Carriage and Wagon Examiners and Greasers.....	4,173	6.45	5.85	5.87
Shunters.....	14,097	6.21	5.76	5.76
Carriage Cleaners.....	4,478	4.92	4.65	.....
Engine Cleaners.....	9,930	4.90	4.29	.....
Checkers (Goods).....	10,095	6.49	5.83	6.15
Ticket Collectors and Examiners...	3,360	5.99	5.58	5.58
Carmen and Draymen, One Horse.	15,078	6.01	5.54	5.72
Carmen and Draymen, Two or More Horses.....	1,758	6.84	5.99	6.47
Porters (Coaching and Traffic)....	18,146	4.79	4.53	4.53
Porters (Goods).....	18,506	5.30	4.86	5.04
Gangers (Permanent Way).....	10,772	6.29	5.72	5.72
Platelayers and Packers.....	44,355	5.14	4.71	4.71
Laborers (Permanent Way).....	27,197	5.26	4.86	.....
Mechanics.....	27,095	7.69	7.18	.....
Laborers (Locomotive, Carriage and Wagon Department).....	8,518	5.28	4.86	.....
All Men.....	365,901	6.47	5.91	5.95
Lads and Boys:				
Trade Apprentices (Locomotive, Carriage and Wagon Depart- ment).....	1,175	2.30	2.24	.....
Engine Cleaners.....	8,165	3.54	3.22	.....
Porters (Coaching and Traffic)....	3,134	2.95	2.85	.....
Porters (Goods).....	1,753	2.99	2.91	2.93
All Lads and Boys.....	35,536	2.89	2.73	2.75

³ The signalmen in England regulate the traffic on their own responsibility, and thus exercise functions which in Germany are carried out by station officials (see FRAHM, *Das englische Eisenbahnwesen*).

ing Sundays). The *bonus* showed in the table, which increases the average weekly rate of wages of men by 4 cents, and that of boys and lads by 2 cents, is only given to certain of the employes for special work and for economic working. The report does not state on what principles the bonus is determined.

Table No. II shows on the whole what influence the *local conditions* exercise on the pay of the railway servants. In it, the average actual earnings are given first, as being of the greater economic importance. But as the figures only represent the earnings in one week, we add a second row showing the rates of wages plus bonuses, because as they form the basis of the wage system, they have to be taken into consideration in judging the conditions; it is very probable that there are considerable variations in the course of the year.

TABLE II.

Class of Workpeople.	1. Average actual earnings, 2. Average rates of wages, including bonus,					in the United Kingdom.
	in towns with a population					
	(a)	(b)	(c)	(d)	(e)	
	of and above 100,000	of 50,000 and under 100,000	of 25,000 and under 50,000	of 10,000 and under 25,000	of under 10,000	
All Adults (six-day and other workers)... .. }	\$6.82	\$6.82	\$6.72	\$6.60	\$5.83	\$6.47
	6.25	6.21	6.17	6.03	5.40	5.95
All Lads and Boys }	2.81	3.01	3.01	3.03	2.93	2.89
(ditto)..... }	2.67	2.83	2.83	2.83	2.81	2.75

According to this, the wages of adults decrease with the size of the towns; but while the drop is comparatively small in the first four groups of towns, it is great in group (e), which also includes the country districts. The actual average earnings are the same in groups (a) and (b); in the other cases it shows the same tendency to decrease as the wages. In making this comparison, it has to be remembered that the higher paid and lower paid classes of servants are not distributed uniformly in the five groups of towns. Thus for instance porters (goods), carmen, draymen and passenger guards form a greater proportion in towns of above 100,000 than in any of the other groups of towns. The same applies, as regards shunters and permanent-way men, to the towns of under 10,000. In this group, there are naturally comparatively few locomotive and train men; these are strongly represented in the three middle groups. The tendency of the pay to decrease with the size of the towns manifests itself in each individual class, but in many cases, it is not so

clearly marked as in the total figures for all the work people. In particular, the difference between the actual earnings in large and in small towns varies. Thus it is comparatively small in the case of engine drivers (from \$11.34 to \$10.99), of firemen (from \$6.74 to \$6.58), of goods guards (from \$7.69 to \$7.51), and of engine cleaners (from \$4.86 to \$4.81). It is greatest in the case of foremen (from \$8.95 to \$7.98), of signalmen (from \$7.47 to \$6.29), of checkers (from \$6.78 to \$5.62), of carmen and draymen with one horse (from \$6.31 to \$5.16), of gangers (from \$7.29 to \$6.05) and of platelayers and packers (from \$6.11 to \$4.86). Similar conditions exist as regards the rates of wages.

A curious point worth notice is that the actual earnings and the weekly wages of lads and boys in the large towns are the lowest. In groups (b), (c) and (d) they are on the contrary nearly the same, while they are a little lower in small towns and in the country, although still higher than the average for the whole country. In this case again the unequal distribution of the higher paid and lower paid classes of employes in the groups of towns exercises its influence; but besides this the difference in the ages is important. The report does not state where the line between "adults" and "lads and boys" is drawn.

Table III is also taken from this very interesting mass of statistics.

TABLE III.

Weekly Rates of Wages, Excluding Towns.	Percentages of employees, who receive the weekly rate of wages stated in the first column, in towns					Average for the United Kingdom
	of and above 100,000	of 50,000 and under 100,000	of 25,000 and under 50,000	of 10,000 and under 25,000	of under 10,000	
Adult Workmen:						
Under \$3.64.....	0.5	0.3	0.6	1.6	4.2	1.7
\$3.64 and under \$4.86	15.9	18.7	22.2	24.7	36.1	24.2
4.86 and under 6.07	39.3	37.4	34.6	34.5	36.1	37.1
6.07 and under 7.29	22.0	18.1	17.7	17.9	12.5	17.7
7.29 and under 8.50	12.0	14.3	13.4	10.7	6.0	10.3
8.50 and under 9.72	4.5	4.3	4.4	3.6	1.7	3.5
9.72 and under 10.93	2.1	3.0	3.2	3.1	1.6	2.2
10.93 and under 12.15	3.2	3.4	3.4	3.5	1.7	2.8
12.15 and above.....	0.5	0.5	0.5	0.4	0.1	0.5
Lads and Boys:						
Under \$1.21.....	0.8	0.4	0.7	0.6	1.0	0.8
\$1.21 and under \$2.43	36.1	25.5	26.4	23.8	22.0	30.0
2.43 and under 3.64	46.0	53.2	50.2	54.8	60.2	50.8
3.64 and under 4.86	16.9	20.9	22.6	20.7	16.8	18.3
4.86 and above.....	0.2	.....	0.1	0.1	.....	0.1

According to this, 25.9% of all adult workers, that is nearly 95,000 men, have a weekly rate of wages of under \$4.86; most of them belong to the classes which receive lower pay. Included among them are 26,000 platelayers and packers, 12,000 permanent-way laborers, 18,000 porters (coaching and traffic), 8,000 porters (goods), and 8,000 engine cleaners. Among the classes which receive higher pay, we have to mention 1,000 signalmen, 2,000 firemen and 1,000 shunters. Of the total number, over 72,000 (23% of the total work people there) are in England and Wales, nearly 12,000 (30%) are in Scotland and nearly 11,000 (71%) are in Ireland. These figures are of particular interest, as the proportion of men receiving wages of less than \$4.86 per week was a matter of dispute between the companies and the trades unions. They show that the trades union estimate,⁴ according to which out of 320,000 employes listed, 134,000 (42%) were receiving wages of less than \$4.86 per week, was over 50% too high. It has to be noted that we are here dealing only with the rates of wages, while the actual weekly earnings of the railway servants, according to the statistics collected, are materially higher than the wages proper, including the premiums,

In forming an opinion as to the existing conditions, it must also be remembered that the rates of wages of railway servants have nearly everywhere been materially increased since 1907,⁵ a fact to which the Board of Trade draws attention in its report, mentioning, however, that precise figures showing the effect of these changes are not available.

II.—OTHER ALLOWANCES REPRESENTING A MONEY VALUE.

Uniform and Clothing.—Besides their pay, 204,237 adult workers and 15,915 lads and boys (time workers) received a free uniform or other clothing. The average weekly value of this allowance amounted to 14 cents per head in the case of all the adults entitled to this allowance, and to 12 cents in the case of the lads and boys. Distributed over the total body of the employees, the weekly value per head amounts to 8 cents in the case of adults and to 6 cents in that of lads and boys. Table IV gives particulars relating to the different classes of servants.

⁴ See appendix XXII of the proceedings of the 1907 railway conciliation commission, in the *Archiv für Eisenbahnwesen*, 1912, pp. 655 *et seq.*

⁵ See *Archiv für Eisenbahnwesen*, 1911, pp. 684 *et seq.*, 1912, p. 900, and *Bulletin of the Railway Congress*, 1911, November, p. 1340.

TABLE IV.

Occupation	Of the total number, the following percentage received a free uniform or other clothing	Average estimated weekly value per head	
		To work people receiving allowance	To all work people
	Per cent		
Goods Guards and Brakemen.....	99.6	\$0.22	\$0.22
Signalmen.....	99.5	.18	.18
Passenger Guards.....	99.4	.30	.28
Engine Drivers.....	97.6	.06	.06
Firemen.....	97.6	.06	.06
Shunters.....	96.5	.20	.18
Porters (Coaching and Traffic).....	92.7	.12	.12
Foremen.....	83.5	.22	.18
Carmen and Draymen.....	47.4	.08	.04
Checkers (Goods).....	39.2	.16	.06
Porters (Goods).....	32.0	.12	.04
Platelayers and Packers.....	17.6	.02	.....
Gangers.....	13.5	.04	.....
Laborers (Locomotive, Carriage and Wagon Department).....	8.5	.04	.....
Engine Cleaners.....	6.8	.04	.....
Mechanics.....	5.4	.06	.....
Laborers (Permanent Way).....	3.6	.02	.....

Houses Rent-Free or at Reduced Rentals.—14,337 adult workmen had, besides their pay, houses rent-free or at reduced rentals. The average estimated weekly value per head, of this allowance, to work people receiving it was 44 cents, but the average if applied to all work people was only 2 cents. This allowance chiefly benefited the following classes: platelayers and packers (9.2% of the total number, 40 cents per head), signalmen (8.1%, 38 cents), gangers (8%, 36 cents), foremen (6.2%, 63 cents), engine drivers (4.3%, 57 cents), passenger guards (3.8%, 46 cents), goods guards and brakemen (2.6%, 38 cents), and firemen (2.7%, 55 cents).

Other Allowances.—Four hundred and thirty adults and 294 lads and boys (dining car attendants) received free food of the estimated value of \$1.84 per week, and 1,388 platelayers and packers were allowed free garden ground of the estimated value of about 2 cents per head. Most railway servants are also granted free traveling passes for themselves and their families once a year, for their annual holidays, and are allowed tickets at reduced rates at other times.

Holidays With Pay.—Of the total number of railway servants in regular employment, about 70% were given annual holidays with

pay, and for about 90% of these (or nearly two-thirds of the total number), these holidays amounted to from three to six days; in most of the remaining cases (30%) they were either two days or from seven to twelve days.

Pensions, Sick Pay, Etc.—A considerable number of railway servants participated in the benefits of contributory pension or provident schemes, to the funds of which the companies contributed; the benefits provided were sick pay, pensions and funeral allowances. Apart from these schemes, some of the work people received full or half wages from the companies for a limited period, if absent through sickness; but in most cases, no such sick pay was granted. In some cases, no sick pay was given to those grades in which extra pay was given for overtime. That is as far as the report about the conditions in 1907 goes. In the meantime, state insurance has been instituted by the act of December 16, 1911, which came into force on July 15, 1912,⁶ This compels all railway servants who have a yearly income of less than \$777.60 (£160), to belong to a sick and pension fund. Under it, all insured persons, who have contributed for at least twenty-six weeks, receive in cases of illness, from the fourth day onwards, free medical treatment, free medicine and sick pay; if they become totally incapacitated, they receive a pension, if they have contributed for at least 104 weeks.

III.—HOURS OF DUTY.

The statistics relating to the hours of duty, similar to those relating to pay, give summaries for the whole of the United Kingdom, and also details for the districts and for different groups of towns. The section containing these very interesting statistics, which cast much light on the English conditions, had to be drawn up in the same way as its predecessors, as it applied to a very important branch of labor, and so came within the scope of the inquiry of the Board of Trade. As a basis for comparing the working conditions on the railways themselves, especially as regards the men engaged on railway work proper, it is of minor importance, as the hours of labor can only be compared on the basis of the importance and the difficulty of the work, which vary in each individual case even at one and the same place. Hence they are independent of the hours of labor of the other work people, whose work, es-

⁶ An act to provide for insurance against loss of health and for the prevention and cure of sickness and for insurance against unemployment, and for purposes incidental thereto.

pecially in factories and large establishments, goes on all the time and is not liable to interruption by the intervals which so often occur in railway work. Hence the general statistics are of most interest. They show the normal hours of duty (exclusive of meal-times and overtime) of the time workers in regular employment, constituting a full week. For over 29,000 work people, who had no definite stoppage for meals, particulars were returned of the gross working time; 94% of them were engine drivers, firemen and signalmen. The figures applying to the classes of employes of most interest are given in Table V.

The daily normal hours of duty per head is obtained by dividing the figures in Tables A and B by 6 and those in Table C by 7. These show that 98.4% of the engine drivers, 99% of the firemen, 95.5% of the goods guards and brakemen and 73.7% of the goods guards have at least 10 hours of duty per day, exclusive of meal-times (Table A). Of these, the following have 12 hours or more: 13.2 (!) % of the locomotive crews, 8.3% of the guards and brakemen and 18.8 (!) % of the passenger guards. As regards the work at stationary places, the shunters were in the most favorable position from this point of view: 44.8% of them had at least 10 hours of duty per day (exclusive of meal-times); but only 0.9% of them had 12 hours and over. Next came the signalmen with 59.5 and 13.2 (!) %, the engine cleaners with 71.9 and 0.3%, the porters (coaching and traffic) with 84.8 and 4.3%, and the porters (goods) with 89.8 and 0.9%. Hours of duty of 8 hours or less were only to be found to any greater extent in the case of signalmen (33.2% of the total number) and of shunters (35%). What the normal hours of duty of the men enumerated in Table A would be, if meal-times were included, cannot be determined, as the report gives no particulars about the duration of the meal-times in question.

Table B, in which the meal-times of the employes are included, shows that the normal hours of duty of the engine drivers and firemen are nearly all 60 to 62 per week, that is, 10 to 10 $\frac{1}{3}$ hours per day. Of the goods guards and brakemen, only 48.1% had hours of this length; but 35% of them had still longer hours, and of these 25.5 (!) % had 12 hours per day or more. In the case of passenger guards, the two last figures were 67% and 38% (!). Just as in Table A, there are three chief groups in the case of signalmen: a large proportion (43% of the total) had 8 hours of duty per day; 39.2% had 10 hours per day and 16.1% (!) had 12 hours or more

per day. Table C relating to the "other workers," among which many of the porters (coaching and traffic) are included, shows that the inclusion of the average amount of Sunday duty which they have to perform results in a corresponding increase in the normal hours of duty of a full week as compared with the averages given in Table A. These averages are obtained by dividing the totals for the normal hours of duty of each class by the totals of the men concerned.

That the actual hours of duty of the English railway employees on the whole exceeded, in this particular week, the normal hours of duty here recorded, is made clear by the table given in Chapter I, according to which the average actual earnings in that week exceeded the average rates of wages very appreciably in many cases; a result due to overtime and to Sunday work. The report says nothing about the number and the length of the days of rest granted to the employees. In the case of the six-day workers, who form the large majority of the total, the necessary days of rest are probably ensured by the Sunday rest allowed, unless this is interrupted by special work. The "other workers" are as a rule called on for Sunday duty every second or third Sunday, so that the other Sundays can be considered as days of rest to them. If one considers the work of the traffic employees, one finds that shorter hours of duty are very rare, except in the case of signalmen and shunters; the usual practice is 10 hours or more per day. Cases of long hours are comparatively frequent, many of them being found under the 72 to 74 hour heading; and it has to be noted that Table A, which includes the large majority of the traffic employees and also Table C, both give net hours of duty, exclusive of meal-times.

CANADA'S MOST SUCCESSFUL RAILWAY YEAR.

A Detailed Study Showing the Growth of the Mileage, Facilities, Traffic and Earnings during the Year Ended June 30, 1912.

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During the year ended June 30, 1912, the railways of Canada built 142.53 miles of second track and 599.39 miles of yard track and sidings. This may not seem like much construction work, and it will probably be regarded as an odd way to begin an article which is intended to present a picture of the most prosperous year in the history of Canadian railway interests. But, properly appraised, these additions mean a great deal, and the singling out of such facts will not appear at all peculiar to modern railway men. Moreover, they imply other conditions equally satisfactory. Additional second track and more facilities for the expeditious handling of traffic are today the outstanding needs presented by the general transportation problem of this continent. The manager of every large railway is in despair over this matter; and his perplexity is intensified by the self-reproach that such a situation could have been saved by foresight and faith. Land which could have been had at a moderate figure forty, twenty, or even ten years ago, is now held at a prohibitive price. Real estate is advancing rapidly in Canada, too; but it may still be acquired at relatively low cost, and optimistic, perspicacious railway men are getting hold of it for sidings and terminals. In doing this they are slightly anticipating their needs; but they are showing sound judgment. Railway expansion in Canada is proceeding at an unprecedented rate, and the day is near at hand when this elbow room at terminals, and these longer and more numerous sidings will justify themselves in net earnings.

It is worth while to give the particulars which are lacking in the foregoing paragraph. The addition of 142.53 miles of second track brought the total up to 1,752.49. Again, this may seem a small matter; but that mileage was equal to 6.5 per cent of the total first track mileage of the Dominion, and was 86 miles more than were added in 1911. Six years ago there were but 1,067 miles of second track in Canada, or 4.7 per cent. Of yard track and sidings there were 4,092 miles in 1907, and 6,149 in 1912. This increase was from the ratio of 18.2 per cent to 23.0 per cent of first track mileage.

While single track mileage increased 19 per cent in six years, second track increased 64 per cent, and yard track and sidings, 50 per cent. This was good business, and its real significance will be better understood when it is pointed out that in 1910—which is the last year for which official figures for comparison are available at the moment—yard track and sidings in the United States had increased but 30 per cent during five years. In other words, it is the rate at which Canada is coming that gives these figures special value. And this matter of relative progress will be found to be the conspicuous feature in all aspects of Canada's railway advancement in 1912.

There is another feature of railway administration in Canada which is distinctly on the side of betterment. During the past four years the expenditure on maintenance of way and structures has represented an average of 21.50 per cent of the total operating expenses. This has been better by 2 per cent than the railways of the United States have averaged during the same period, and it reflects a disposition to secure efficiency. The upkeep of equipment has also been equal to over 20 per cent of operating expenses, and that percentage is understood to demonstrate sound railway management the world over; but it falls below the United States average. In the light of what has been done in this regard in Canada in the past, it points to safe policy. In 1907 the outlay on way and structures was \$930.30 per mile of line; in 1912 it was \$1,179.11. The total expenditure for maintenance of equipment in 1907 was \$965.01 per mile; in 1912 it was \$1,115.41. This is also below United States figures; but the ratio of increase has been greater on the Canadian side of the line. The point which these facts emphasize is, that the railways of the Dominion are not fattening immediate net earnings by neglecting either roadbed or equipment, in which they are merely true to the best traditions of prudence. They are living up to the highest standards in all that makes for the economical handling of traffic.

First track mileage was increased by 1,330 miles during the year, bringing the total up to 26,727. In no preceding year had such a large addition taken place. Eighty-three per cent of the new mileage put in operation was in the western provinces, and with avidious appetite, they are crying out for more. As a matter of fact, 1,623 additional miles of line were in actual operation in 1912, and 1,738 had been completed; but officially these 3,361 miles were regarded as being under construction. Had they been taken into the count the

operating mileage of Canada would have reached 30,088, or a larger total than that of Great Britain. There were altogether in the official sense 8,826 miles under construction on June 30, 1912; but the definition of that term would not be strained if it were said that more than 10,000 miles were actually in process of being built. "Under construction" applies to work lying all the way between the exploratory survey and the opening of the road for traffic. It might be observed, however, that, while the preponderance of this prospective mileage is in the west, slightly over 40 per cent of it is located in the east. Turning again to the relative idea, it is encouraging to Canadians to realize that, measured by population, they are building railways at twice the rate of their progressive neighbors to the south. They are still maintaining the unique position of having the highest mileage per capita of any country in the world, yet see room for further growth in the fact that by the territorial test they are at the very foot of the list.

Without any qualification, it may be said that the Canadian people are at this juncture concerned more in securing two things than anything else—markets and transportation facilities. To get these they have not only made very considerable sacrifices; but, with perfect cheerfulness, are prepared to make still larger drafts upon the public treasury and the national credit. The burdens arising out of what has already been done to aid railway construction are represented in cash subsidies of \$208,072,074, contributed by the Dominion government, by the provincial governments and by municipalities; in land grants aggregating 56,052,055 acres, and by guarantees aggregating \$245,070,045. For 1912 the increase in cash subventions over 1911 amounted to \$5,892,818, in land of 6,000,000 acres and in guarantees of \$96,733,688. The government is also constructing the eastern division of the Grand Trunk Pacific at a cost which the minister of finance announced in parliament would probably reach \$243,000,000. An expenditure of \$117,000,000 has already taken place. These items added together make \$696,142,119, without placing any money value on the land grants. It is impossible to say what the latter are worth; but the holdings of the Canadian Pacific and the Canadian Northern in the west would realize not less than \$150,000,000 at prevailing prices. During the past year railway lands averaged \$13.70 per acre, and the sum received from sales amounted to \$18,200,000. The Canadian Pacific had an average of \$15.99 for 669,639 acres; but received \$40.25 per acre for 3,270 acres

of irrigated land. The Canadian Northern averaged \$15.17 per acre, as compared with \$12 in 1911. Guarantees have been the popular form of aid during recent years, and governments of the western provinces have assumed obligations in that regard beyond \$150,000,000. In the majority of instances the guarantee is of both principal and interest for a long term of years. In the case of the Grand Trunk Pacific, the Dominion government not only guarantees the interest on bonds, but makes up the difference between the sale price and par.

Canadian railways hauled 89,444,331 tons of freight in 1912, or 9,560,049 more than in 1911. This was the largest increase in any year. There were also 41,124,181 passengers carried during the year—a gain of 4,025,463 over the preceding year. This larger volume of traffic created a heavy tax on equipment and, in the autumn months, the movement of the western harvest was marked by considerable congestion. Nevertheless, the conditions in that regard were much better than in 1911. This was due in part to more rolling stock, but chiefly to better organization. The additions to equipment in 1912 embraced 265 locomotives, 13,760 freight cars and 433 passenger cars. The demand for new freight cars has been far beyond the capacity of domestic industries, and during the year orders were placed in the United States for over 14,000 units. The total equipment orders of the Canadian Pacific during the past year had a money value of \$48,000,000, which is said to have been double the amount ever given within such a period by any railway in America. These orders included 467 locomotives, 26,653 box cars, 94 sleepers, 25 diners, 57 tourist cars and a great deal of other rolling stock. The available supply of cars in the Dominion for freight service reached a total of 140,918 on June 30 last, and on that date the official statistics show a material increase in carrying capacity. For example, in 1907 there were but 9,790 cars of the 80,000 pounds class in Canada; in 1912 there were 21,951. Of the 100,000 pounds class, the number during the same period had grown from 3,448 to 7,135.

There was a betterment in passenger density over 1911 of 6,291, and passenger miles increased by 304,282,712. Gross earnings per passenger train mile were \$1,390, as compared with \$1,263 five years ago. Per freight train mile the advance was from \$2,069 in 1907 to \$2,494 in 1912—equal to 20 per cent. Per mile of line, the number of passengers carried was 1,539—a gain of 79 over the preceding

year. A comparative summary of these and other statistical data is as follows:

	1911.	1912.
Number of passengers	37,097,718	41,124,181
Passengers carried one mile.....	2,605,968,924	2,910,251,636
Passengers one mile per mile of line.....	102,597	108,888
Passengers per mile of line.....	1,460	1,539
Average passenger journey—miles.....	70	71
Passengers per train.....	60	62
Earnings, passenger service.....	\$58,317,998	\$65,048,187
Average receipts per passenger.....	\$1.360	\$1.375
Average per passenger per mile—cents.....	1.944	1.943

There was a gain in 1912 of 3,509,712,232 ton miles over 1911, while freight density was increased by 99,947. The average revenue per ton per mile declined from .777 in 1911 to .757 in 1912, which scarcely gives support to the persistent complaint that freight rates are being advanced. As indicating the activity in freight movement during the year, loaded cars had a mileage of 1,102,719,543 as compared with 946,946,917 in 1911. There was an appreciable betterment in the average load of both cars and trains, and in the number of cars per train, while the length of haul went up by 18 miles. The following summary of facts for 1911 and 1912 will give a concise view of the freight situation:

	1911.	1912.
Tons hauled	79,884,282	89,444,331
Tons hauled one mile.....	16,048,478,295	19,558,190,527
Tons, one mile per mile of line.....	631,829	731,776
Average haul, miles.....	200	218
Average tons per train.....	305	325
Average cars per train.....	18.03	18.19
Average tons per car.....	16.91	17.87
Average per ton per mile—cent.....	.777	.757

One or two things occurred during the year which emphasize the part played by transportation facilities in the economic life of nations and communities. Canada is essentially an agricultural country, with large live stock and dairy interests, and yet in 1912 she imported several million pounds of mutton from Australia, and several million pounds of butter from New Zealand. It would have been impossible to go farther for such products. It cost, however, half as much to bring a pound of mutton from the Antipodes to the Pacific coast as it did to deliver it from the butcher shop in Vancouver to the home of the consumer. That is to say, this mutton was brought from Sydney to Vancouver at a freight cost of slightly over two cents a pound; and the special committee which investigated the meat problem at Washington declared that it cost four

cents per pound to maintain a delivery service between the retailer and his customers. The New Zealand butter was brought to Vancouver by steamer, and thence by rail as far east as Montreal, where it sold at 40 cents per pound to consumers. The freight cost by water and land was less than four cents per pound. That this was not a mere spasm in trade is demonstrated by the fact that this winter millions of pounds of New Zealand butter will be delivered in Canada under contract. A more striking illustration of what transportation facilities do could not well be found. It demonstrates very clearly that the producer and his market are not separated by miles, as is popularly assumed, but by freight charges. One should not say: "New Zealand is 10,800 miles from Montreal"; but rather, "New Zealand is 3.8 cents per pound from Montreal." If either the butter or the mutton had been produced 150 miles away from Ottawa, and it could not have been moved by either steamer or railway, the cost of hauling that distance would have been greater than it actually was from New Zealand or Australia.

The record gross earnings of \$219,403,753 were the inevitable result of increased traffic. A betterment of over 16 per cent in total revenue for 1912 suggests material expansion in production and marketing. Freight yielded over 75 per cent of the year's gain, although, as has been said, the ton-mile rate was lower than 1911. This gain was chiefly in the hauling of 3,500,000 more tons of agricultural products, and 2,750,000 more tons of manufactures—indicating a larger harvest and greater industrial activity in the Dominion. There were further earnings of \$21,221,775 from outside operations, with a balance to the good of \$5,888,157. These operations were principally in the conduct of steamship business and hotels; for it must be borne in mind that Canadian railways are getting to be large owners and operators of steamers. The Canadian Pacific alone has a fleet of 70 vessels, of which 16 are on the Atlantic and 3 on the Pacific. The remainder are in service along the Pacific coast, on the Great Lakes and on the lakes and rivers of British Columbia. The Canadian Northern has two large steamers on the Atlantic, and the Grand Trunk Pacific has two on the Pacific coast. It is obvious that railway traffic in an exporting and importing country like Canada must create business on the ocean; and railway owners of Canada seem disposed to control things at both ends. Railway hotels are also multiplying, and would seem to be profitable. The Canadian Pacific has made the largest investment in this

regard; but both the Grand Trunk and Canadian Northern are following the tempting example set. Earnings from express business have increased by 61.5 per cent in five years. All the leading railways carry on a service of that nature, first paying themselves liberal rates for "express privileges," and then declaring attractive dividends from what is left over. They also earn millions out of their telegraphs, which are spread over the whole country, and some of them control large electric railway interests. Whatever else may be said, it must be admitted that these railway hotels, steamers, and express and telegraph services are the best in the country. The railways conduct such interests with splendid skill.

Gross railway earnings in 1912 showed an increase of \$30,670,259 over the preceding year. Thirty years ago the total earnings were less than this increase. These gross earnings equalled \$8,209 per mile of road, as compared with \$6,397 five years ago. In 11 years the aggregate earnings per mile have more than doubled. Revenue came from the following sources in 1911 and 1912:

	1911.	1912.
Passengers	\$ 50,566,894	\$ 56,543,664
Mails	1,869,414	1,914,720
Express	4,674,135	5,294,388
Baggage, parlor cars, etc.....	1,207,555	1,295,415
Freight	126,570,534	149,961,140
Station and train privileges.....	826,252	1,086,687
Telegraphs, rents, etc.....	3,018,710	3,307,739
Total	\$188,733,494	\$219,403,753

It will be observed that while there were substantial increases in all the divisions, passengers and freight scored heavily. Per ton, gross earnings from freight rose from \$1.561 in 1911 to \$1.655 in 1912. In this regard the gain in five years has been equal to over 12 per cent, which is largely accounted for by the hauling of a larger volume of high class commodities, as was pointed out in a preceding paragraph.

Operating expenses in 1912 were equal to 68.7 per cent of gross earnings, and amounted to \$150,726,540. In this connection there was exhibited a further rise in the cost of running a train one mile. That cost has almost doubled since 1899. It was then 77.9 cents; it is now \$1.493. An analysis of items making up the total expenses of operation reveals a persistent advance in the cost of fuel and labor. The conditions in regard to employes would seem to be the same on both sides of the line. The unions co-ordinate and the proc-

ess of leverage is identical. Just where the upward movement will stop nobody seems to know. Operating cost in 1912 amounted to \$5,639 per mile of line.

It would take up a good deal of space to deal comprehensively with the financial position of Canadian railways. The salient facts alone can be given place. The official statistics show a capitalization in 1912 of \$1,588,937,526, of which \$770,459,351 was represented in stocks and \$818,478,175 in bonds. This liability would be equal to \$59,454 per mile of line if the whole sum were divided by the mileage given in a preceding paragraph; but neither the divisor nor the dividend would in that case be correct. After deducting from capital figures duplication and dead liability, and excluding the mileage of government owned lines, the true quotient in the calculation is \$50,832 per mile. That is a relatively low figure. It is slightly below the actual cost per mile of government owned lines in Canada. It is well secured. Against it stands a steadily swelling volume of gross and net earnings. The former have increased by 128 per cent in ten years, and the latter by 141 per cent. Dividends have gone up from a total of \$12,760,435 in 1907 to \$31,164,791 in 1912. The dividend payments of the past year were equal to 4.05 per cent on the entire stock liability—good or bad, alive or dead. The railway bonds, in so far as they are a real liability—that is, when duplication has been eliminated—are gilt edge. Both principal and interest are safe. Thirty per cent of them are backed by government guarantees. The capital liability of Canadian railways is growing at the rate of \$100,000,000 a year, and in this growth the United States has both a direct and indirect interest. To the extent of nearly \$100,000,000 it has been created by American ownership on the northern side of the boundary, and Americans are the holders of an enormous volume of Canadian railway stocks and bonds. The indirect interest arises from the fact that every mile of railway built in Canada means a call upon American producers for more or less of the equipment and operating necessities. For example, the United States supplies 95 per cent of the lubricating and signal oil used by Canadian railways.

Canada, by every proper test, is going ahead rapidly. In many parts, particularly in the west, the activity is spoken of as "a boom." Whether or not the term applies depends wholly upon the point of view. Certainly real estate is selling at high figures in the more promising centers. But what has created these centers? The rail-

ways in every case. And, while the railways have primarily brought about this new scale of values in real estate—real estate which yesterday was worth but a few dollars an acre for farming purposes—the foundation of what is taking place in the west is the rising tide of immigration. Now, as in the past, and as it always will be, the so-called value of land is vested in the people on the spot. As people gather in communities the rise in land values is merely an expression of permanency, and that permanency cannot exist without transportation facilities; which is another way of saying that Canada's boom must be reflected in railway expansion. The ground work of development has been laid; for history is sure to repeat itself in the sense that what happened in the American west between 1860 and 1890 will happen in the Canadian west between now and 1930. An established flow of population creates accretive power; and in the case of Canada that power rests on the fact that free farming lands will be a thing of the past when the public domain of the west is taken up.

The part which Americans are taking in the peopling and development of the Canadian west, and of Canada generally, is quite important. Hundreds of thousands have crossed the line during the past six or eight years to take up farming land, and many others have come over to share in the money making chances which arise in new and rapidly growing communities. Upwards of 1,500 miles of railway are now being operated in Canada, representing a capital outlay of \$100,000,000, which are mere extensions of American systems. Millions of tons of freight move annually across that imaginary line called the international boundary. It is very much an imaginary line so far as the railways are concerned; for trains move backward and forward over it with the same freedom they cross state lines. Canadian railway corporations own thousands of miles of line in the United States. Reports to Ottawa are made on precisely the same forms, and governed by the same classifications, on which reports are made to Washington. For railway purposes the line is unrecognizable; but it is there, and the fact that it will remain there need not in any sense hamper the growth of international transportation interests. Those interests will and must increase. The flag is scarcely an element in the matter, even as a sentiment. Trade follows the ship and the railway. Canada is the second best customer of the United States, and the United States is Canada's second best customer. The prosperity of Canada means

more business for the United States, whether that prosperity is demonstrated in additional railway mileage, in swelling population or in larger production. Hence, the story of Canada's best and most encouraging railway year must be a matter of genuine, and not entirely unselfish satisfaction to those who live south of the forty-ninth parallel.

Reference to accidents can hardly be avoided. In 1912, Canadian railways killed 568 persons and injured 3,780. Of the killed, 47 were passengers. One passenger in every 872,855 was killed, which was an abnormal ratio. One passenger in every 84,792 was injured, which reflected a very bad year in respect of casualties of that class. A study of accidents to employes over a period of years reveals the somewhat surprising fact that relatively the same number suffer injuries every year from practically the same causes. That is to say, in proportion to numbers there are about the same number killed and injured every year from say jumping on or off trains, from coupling or from other avoidable causes. It might be supposed the number of accidents would have more or less direct relation to train mileage, as representing the measure of risk; but such a law cannot be found in an analysis of casualty statistics. Accidents at highway crossings were numerous in 1912, notwithstanding the steady elimination of grade crossings and the installation of many warning devices. The high proportion of trespassers killed tells the story of fatal haste at city crossings when the protective gates are down. The killing of 235 trespassers in other ways rather shows that Canadian railways will soon learn to sympathize with American roads in the matter of the tramp nuisance.

The number of employes reached 155,901 in 1912—an increase of 14,677 over 1911. The additions were equal to 31 per 100 miles of line, and brought the total up to 583. The salaries and wages bill for the year was \$94,237,623, including outside operations; but making a deduction of \$6,937,984 on that account, the total for comparison with other years was \$87,299,639. This was \$12,685,901 higher than the figures for 1911, and the total was equal to 58 per cent of operating expenses. On the basis of the statistical family, it has been estimated that one person in six gets a livelihood, directly and indirectly, out of the operation of railways in Canada. The calculation would not have to be strained to bring the ratio up to one in five. As an example of the indirect interest, it is probable that the supplying of 15,000,000 ties in 1912, at a total cost of

\$6,500,000, represented an income of \$700 for 9,285 persons; or the livelihood of 46,000 souls on the statistical basis. Incidentally, it might be observed that the cost of ties has more than doubled in fifteen years, and the use of treated sleepers has commenced as a matter of economy. The average cost per tie in 1912 was 44.7 cents.

Looking back over what has been written, it will be observed that Canadian railways in 1912 made entirely new, and in some respects surprising, records in practically every statistical aspect. The additions to mileage of first track, second track, and yard track and sidings, the increase in traffic, the additions to equipment, the gains in all the earning divisions, the multiplication of employes, and the betterments in trainload and efficiency tests in general were the largest in the history of the Dominion. By every standard of appraisal the year showed unexampled prosperity. More important, however, than these immediate results, is the warranted assumption that an era of extraordinary expansion in railway interests has begun. The railway people are keenly alive to their trackage and equipment needs in view of swelling immigration and the rapid development of the western provinces. They are adding to their transportation facilities on a scale which mirrors their optimism, and yet, build as quickly as they may, it is not probable that they will be able to get ahead of their needs. Traffic keeps up with new mileage. This is a situation which represents the fruition of long-cherished hopes; but Canada does not close her eyes to the fact that in this growth the United States has a genuine interest. It does not mean rivalry. It means, as has been said, larger business on both sides of the line.

There is one further feature of the Canadian railway situation which calls for a closing observation. No matter what expansion may take place or how many new lines may be built, the tendency to centralization seems likely to continue. The smaller roads will be absorbed by the larger. During the past year this process has been actively in operation. The annual report of the Canadian Pacific to its shareholders is largely taken up with the story of absorption. There are some who profess to see danger in this; but there will always be another side to the matter. Whatever else may be true, the change of control carries with it development and efficiency. Strength succeeds weakness. In the last analysis transportation facilities are bettered.

RAILROAD BUILDING, SERVICE AND REVENUE.

BY L. E. JOHNSON,
President Norfolk & Western Railway Co.

Before Grain Dealers' National Association at Norfolk, Virginia,
October 1, 1912.

I must confess that I was gratified when I found out that I had been requested to present my views with reference to railroad building, service and revenue. This is a work to which my life has been almost exclusively devoted and the subject concerning which I should be best informed, but the fashion now-a-days, when information concerning railroads is sought, is not to make inquiry of those who have devoted their lives to the service, but reference is made to the expressed opinion of some economic theorist, or to a legislative committee composed of lawyers, doctors and farmers. They decide whether a two-cent rate is remunerative and other questions affecting railroad service equally intricate, and concerning which they are without information on which to base a reasonable judgment. Hence, I even feel immensely flattered that the Grain Dealers' National Association has the notion, however erroneous that notion may be, that the president of a railroad company does know something about railroads.

It is now some forty years ago—it may have been more, but we will let it go at that, for I will admit to that length of service without further proof—since I began my work in the lower ranks of railroad service, and the thing that most impressed itself upon my mind in connection with the service was the caution painted on the signboards at many railroad crossings: "Stop, Look, and Listen." It would be a very wise and fortunate thing for the American people, as they consider the various phases of the railroad problem as they confront the country today, to observe that maxim; and that, in considering the relationship of the railroads to the people of this country, the public should "Stop, Look, and Listen."

No one can obtain a proper notion of the present situation nor predict the mode in which the railroad problem can be best handled in the future without studying the conditions that have sur-

rounded railroad construction and operation in the past. Railroad building has been wholly developed during the past seventy-five years. In its beginnings and during its experimental stages, no one could tell whether or not railroad transportation could be made commercially profitable. That the construction of such roads would result in great benefit to communities to which they were tributary was easily and quickly recognized. The great expense, however, involved both in construction and maintenance was such that in the early history of railroad construction no individuals were willing to embark their fortunes in such uncertain enterprises, and hence it was that, throughout this country, the earlier roads were constructed under the auspices of the state governments and with funds largely contributed by the state itself, or by the communities that were to be directly benefited by the location. These roads were almost always short lines, usually connecting up two cities or communities that were chiefly instrumental in the promotion of the enterprise and with no connections between themselves. They were local in their character and depended upon the local business for their maintenance and development. The experience of some twenty-five or thirty years demonstrated the fact that upon very few of such lines was the local business capable of meeting the vast amount of expense incident to the maintenance even of a short line of road, and hence it was that practically all of the state-owned and state-operated railroads of the country have, from time to time, passed through the bankrupt court and their existence as separate organizations wiped out.

It was at this stage that the expanding business of the country justified the adjustment of railroad facilities for the development of through business and a policy was inaugurated for the establishment of through lines of traffic which would tend towards the establishment and maintenance of consistent and regular traffic which would, by its bulk, justify the construction and existence of a more extended train service, and hence a cheapening of the cost of the units which go to make up the final sum of transportation expenses. This work could not have been carried on by a state road, subject as those roads were to the control of the legislatures of the various states that had subscribed to and, in most instances, controlled the major portion of stock of such roads. Circumscribed as they were by the limitations of state lines, the union and amalgamation with roads outside the state was an impossibility, and hence such roads

languished until they could no longer be maintained. State ownership was abandoned, not by reason of any defined purpose on the part of the states to relinquish their control of and interest in these highways of commerce, but by reason of the fact that the ownership, control, and operation by the state of such avenues of commerce became practically an impossibility. No commercial enterprise, however patriotic, can succeed unless it pays. The state-owned railroad failed to meet the commercial necessities of the times and hence such ownership passed away by sale, either voluntary or involuntary, evidencing the collapse of an unworkable proposition.

This may be termed the first stage of the railroad problem in this country, which came to its conclusion about the period of the Civil War, and at least demonstrated one phase of the situation—that is, that the American people will not look again to either the state or the national government to provide its transportation facilities. Political appointees for such work will not make the wheels go around.

The next period, extending for some twenty-five years, was a period of expansion and construction involving the establishment under private ownership of co-ordinated lines of railway, or railway systems as they are commonly called, under which great trunk lines have been established which have been potential factors in the development of this country and the establishment of great industrial centers.

During this period, the conduct of the railroad business was carried on as a private business, divested of state ownership and practically without any supervision from either federal or state government. The simple fact is that the experiment of state-owned or government-owned railroads had been so costly to the communities which had entered upon that experiment that they were very willing to surrender all of the functions of government, so far as necessary for railroad construction, maintenance and development, to anybody who was willing to risk his money in an enterprise which had been so disastrous to the states themselves, so far as the investment was concerned, and the responsibility for which they were anxious to be rid of.

It was during the period of the generation succeeding the Civil War that railroad construction reached its highwater mark. The imagination of the American people was aroused and the develop-

ment of the Western states proceeded with unexampled activity. The railroads were the pioneers in all of this development and whatever may be said for or against the men who, during that generation, were potential in the control of the affairs of the railway companies, still it must be admitted that they were the most potent factors in the building up of American industry and communities, and to them belongs the largest share of credit for the uplift given to the American nation. It is true that they carried on their great business with a free hand and now and then an injustice may have been suffered by some community, yet, surveying the history of the time, there can be but little doubt that the final results were highly beneficial to the American people, and under no other conditions is it at all probable that the same tremendous advances could have been accomplished.

It was a period of fierce and uncontrolled competition, in which the qualities of the statesman and general were both brought into action and on each of these lines were developed men capable of holding positions alongside with the heroes in statecraft or war that have been produced at any time or by any nation. The establishment of trunk lines of railroad traversing our continent involved the exercise of capacity, of daring, of persistent courage, and diplomacy unexcelled in the history of any nation or time.

It is true that the fierceness of the struggle for business which was necessary to maintain the financial integrity of the great railroads which had been constructed brought about practices that, under present conditions, are considered and were, in fact, reprehensible in the extreme, but he is a poor philosopher or critic who undertakes to criticise a particular custom, habit, or practice outside of and away from the environment which brought about the practice.

These things were all part and parcel of a career of progress brought on by American enterprise and initiative. They accomplished their own great work and, having accomplished it, they have passed away like many other things which were part and parcel of the same system.

By this brief history, one who "stops, looks, and listens" will have seen that we have practically, in this country, passed through two stages of railroad development, the first being the stage of government-owned, but not government-operated, railroads, and the second stage one of privately owned railroads divested of government own-

ership and practically free from governmental control. The first resulted in the financial collapse of the roads themselves, and the second in a competition so fierce and relentless that practices became prevalent which resulted in grave injustice to individuals and communities.

Thus we see that two systems of railroad development have been in practice tried out by the American people—one, after reaching a stage of practical collapse, has been definitely abandoned, and the other, although resulting in conditions which were subject to grave criticism, produced results highly creditable to American enterprise and initiative. The next problem was to preserve the good and eliminate the bad features of the existing system or adopt some new plan of handling the transportation problem.

It soon became apparent that only two possible solutions remained to be exploited. Those were: Either the taking over by the federal government of the railroads of the country, whereby that government would become the owner and operator of the railroads of the country; or to continue the operation of the railroads under the same ownership and control under which they had been constructed and developed, but imposing upon them government supervision and regulation of their rates and practices.

So well satisfied was the mind of the American people concerning the inexpediency of a republican government undertaking to operate tens of thousands of miles of railroads, necessitating the employment and the conversion of hundreds of thousands of voters into government employes, that practically by unanimous opinion any idea of the government undertaking to place upon itself the burdens, risks and dangers of the transportation problem was soon abandoned, and the other alternative was easily accepted and is now a part of the policy of this country.

Whether the present system will be entirely successful is yet an unsolved problem, and its final success will depend upon the intelligence and patience of the business men of America and their willingness to co-operate with the railway companies upon a fair and reasonable basis.

It goes without saying that the present system of supervision, control, and regulation has and will have a general tendency towards the curtailment of railroad construction. The element of speculation has always been dear to the hearts of the adventurous and courageous Anglo-Saxon race. Its imagination has been stirred up by the

possibilities of conquest, whether in the field of battle or industry, and the hope of great reward has been the incentive which has induced the taking of great risks. These were the conditions and hopes which inspired the pioneer road-builders, when no question about "reasonable rates," or "reasonable return on the investment," or "watered stock" was asked, and people were willing to risk their lives and fortunes in the construction of great roads, the development of which held out hope of great reward. Whether this restrictive tendency will continue to such an extent as to substantially impair the progress of American industry and enterprise in the further and complete development of the transportation business, cannot yet be determined, but if it should happen that American initiative is curbed and fettered as the result of too much regulation, then the benefits resulting from this control have been purchased at too great a cost. No nation can afford to destroy the enthusiasm and imagination of individuals engaged in great enterprises. Dry rot would follow.

Our people, whether in the railroad business or any other business, are and ought to be willing to impose upon themselves such restrictive laws as will provide that each one shall receive fair treatment and even-handed justice from every public service corporation, and no one should be restive under the operation of laws which have for their object the accomplishment of these purposes, but any laws which fail to recognize that the railway companies, under the present status, are conducting a business, the rights of which are and must be respected, are unjust, unequal, and bring about positive and specific wrong to those whose lives and fortunes are dedicated to the work, and such injustice will, in the end, bring about grave perils to the nation itself. The simple fact is that private capital has come in and is today and, for more than a generation, has been furnishing to the American people transportation facilities which the states at first undertook to furnish and which actual practice showed that they were incapable of furnishing; and, having invoked the investment of private capital in these great enterprises, such capital is entitled to such fair reward as is consistent with furnishing a reasonable service at reasonable rates. If such reasonable rates in fact produce a liberal return on the capital invested, it should be the subject of congratulation and evidence of the fact that the company is in fact properly fulfilling its duty as a public servant.

It is unquestionably a fact that, whether the railroads of this country will be permitted to enjoy a proper revenue, will be dependent upon the good sense and fair judgment of the business men of this country. They are the people who, in the first instance, pay the rates, and it is at their instance and as the result of litigation instigated by them that the usual attack is made.

The making of railroad rates is so complicated a proposition, involving so many elements concerning which there may be differences of opinion, that there are few, if any, rates, established by any of the railroad companies which may not be subject to some plausible attack, and it would seem that the tendency nowadays is to litigate practically every rate or rate adjustment. To my mind, this condition presents an unfortunate state of affairs from which the railway companies are receiving substantial harm, the effect of which, if continued, will eventually be far reaching. While it is true that the mercantile shippers of the country have but comparatively slight interest in the actual amount of a given rate for the reason that a proper and reasonable transportation cost ought to be and is absorbed in the price of the article to the ultimate consumer, yet such shippers are vitally interested in the relation of rates, as such relation cuts a large figure in competitive business and may be potential in the selection of the place at which the business is to be done. Under these circumstances, experience has developed the fact that in but a small part of the litigation over rate questions has emphasis been placed upon the unreasonableness of a particular rate in and of itself, but the cases have usually rested upon the question of the relationship of the rates and decisions have usually been made on the theory that, if a railroad can haul certain traffic to such and such a place at a given rate, why may it not be compelled to haul such traffic to another place at a similar rate? I am not proposing to go in detail into these questions, but I desire to bring home to you the viewpoint of a railway company to these rate controversies, which I think are worthy of consideration by any association of fair-minded business men. You will easily recognize that, as a business proposition, the railway company is chiefly interested in its own revenue, for without adequate revenue it can neither perform its duties to the public nor properly protect the interests of those who have risked their money in the business of the company. If the roads do not earn sufficient revenue to make the operation a paying proposition, then the result will be a financial

collapse such as has heretofore happened with the state-owned roads, to which allusion has already been made.

When a given rate is reduced, not because it has been shown to be excessive in and of itself, but because of its relation to some other rate, or because on account of some competitive reason it has seemed fair to a commission or court that a particular community should have a particular rate granted regardless of the question of cost, then it is apparent that the railway company is losing revenue which ought to be made up from some source, but yet I think that the shippers of the country, in their zeal in promoting their own interests, have a disposition to press lower rates upon the railway companies without giving proper consideration to the needs of these companies for adequate revenue.

What I have just said, I think, is correct reasoning unless, as a matter of fact, the railroads of this country are earning an excess amount of revenue. If this is true, then it would be just and appropriate to demand a reduction and readjustment of those rates.

There was, a few years ago, a general idea prevailing in the minds of the American people that the railroads of the country were guilty of great extortion in their charges exacted from the shipping public, and that the roads were endeavoring to secure for their stockholders large returns upon supposed investments that had never been made and that the value of the properties embarked in this public service was in no degree commensurate to the capital upon which the railroads were asking a return. The investigation, however, by state commissions, the Interstate Commerce Commission, and by the courts in rate cases, has practically exploded this theory, for in every case where a thorough and scientific investigation has been made of railroad property, it has been demonstrated that the outstanding capital upon which return is asked is less than the value of the property actually devoted to the public service, whether that value be ascertained by its present cost of reproduction or the actual cost of construction of the premises and property so dedicated to the public work.

When this capital account of the railway companies is thoroughly recognized and accepted by the public as being a fair and reasonable representative of the investment upon which the owners may properly ask for a fair return, it would seem that a large part of the matters in controversy should be eliminated, for concerning the receipts and disbursements resulting from the operation of the rail-

roads of this country, such matters are an open book, subject to the inspection of any one who desires to examine the reports regularly filed in public records. The returns on these investments are known to be very meager, probably not exceeding, on an average, four or five per cent, and not averaging that on ninety or ninety-five per cent of the railway mileage of this country. No fair-minded man engaged in business will claim that such a return is excessive.

The critics of the railway companies and fault-finders heretofore concentrated their attack and attempted to prejudice the public mind by claiming excessive capitalization, emphasizing this charge by the popular by-word of "watered stock." Investigations, however, have shown, for all practical purposes, that these charges are without foundation and the attacks against railway companies are now, to a certain extent, concentrated on the fact that, although they do not pay excessive returns to their stockholders on the sums invested on account of capital, yet that the roads earn large sums of money in addition to the amounts that are distributed among their stockholders and these sums are paid for the purpose of betterments, renewals, and repairs, and that thereby the excessive revenues are collected and used for unnecessary purposes, or at least for purposes to which current revenue should not be demanded. On this point I invoke the aid of conservative business men for the purpose of creating a proper public sentiment towards the proper financing of these instrumentalities of public service. The railway companies of this country should have revenues sufficient to properly and promptly pay the cost of doing business, including a reasonable return upon the fair value of the property devoted to the public service.

To this there can be no denial, nor will the most radical reformer enter any protest against rates which are adjusted to accomplish this end, but, in addition, the business men of this country who are in the habit of dealing with large affairs and who recognize the vicissitudes surrounding great business enterprises will concede that it is right and proper that, in addition to the revenues just mentioned, the railroad company should be permitted rates that will accumulate a reasonable surplus which will enable it to furnish such non-revenue producing betterments that advancing civilization demands and which the progress of the country deems essential to the public safety and convenience, as well as to tide over the lean years of operation which inevitably come in every business.

For instance, in years gone by, grade crossings were not deemed injurious to the public safety. In these days on busy railroads, such crossings are a menace to the public and every well-conducted road in this country is using its best endeavors to eliminate such dangers from operation. When broken crossings are made it is a difficult proposition to add such cost to the capital account. Unless they involve the expenditure of considerable sums of money, they should be paid for from operating expenses, not as a part of operation, it is true, but out of operating expenses in the sense that when the results of the operation of the road create a sum sufficient to enable the road to put in such non-revenue producing improvements, then such roads should not be subject to criticism in a rate case on the ground of earning excessive revenue, with the consequent conclusion that its rates are extortionate. So it is with the renewal and construction of its smaller country stations, and many other illustrations could be multiplied showing the necessity of revenue over and above a reasonable return to the stockholders in order that the financial integrity of the railroads of this country may be maintained.

In the event that no such allowance is made and the demands for such improvements are pressed and in many cases compelled by controlling authority, the money must come from increased capitalization. It is doubtful whether capital can be secured for the railroads of this country when the proposition is fairly placed before the investing public that the purpose of such capitalization is to add public conveniences and additional safeguards which are recognized as adding nothing to the earning power of the road; and, in the event that such capital can be obtained by reason of the reserved credit of the road applying for loans, then it must be recognized that it will not be many years before the railroads of this country, like the railroads of England and continental Europe, will become topheavy as the result of outstanding capital, with its attendant overhead charges, and will be utterly unable to pay a reasonable return thereon without exacting from the people rates which, at that time, will doubtless be in fact burdensome. Foreclosure and accompanying financial disaster must follow such a policy.

Only a few words more and I have finished. Perhaps I have already taken up too much of your time in discussing these matters which are of common interest, but emphasizing the viewpoint of the railroads. Yet, if I have, it is due to your own invitation which

has directed me, in the assignment of my subject, to discuss before you railroad building, service, and revenue, and the greatest of these is revenue, for without that there can be neither railroad building nor adequate service.

Each of us are representatives of great interests which have been and will continue to be potential in the development of this nation. I sincerely hope that you will not come to the conclusion that I have been speaking two words for myself and the interests that I particularly represent and only one for you and your association. This has not been my purpose. My long experience in railroad work, which has brought me necessarily in contact with many other great enterprises and businesses, has, I hope, tended to free my mind, in some degree at least, from narrow prejudices or lop-sided views on these subjects, and I hope in the suggestions that I have thrown out that they have come from an earnest desire to increase and preserve for the American people that which will stand for the best interests of the people as a whole.

I can, however, see breakers ahead in the handling of this transportation problem and it is my purpose, in every way in my power, to induce such people with whom I come in contact, to "stop, look, and listen," for by such thoughtful observation alone can future troubles be avoided.

The American people demand a prompt, efficient, and adequate transportation service without discrimination and with readiness to serve all upon equal terms, and this they are entitled to have at reasonable rates. This character of service the railroads should be willing and must give, but while performing the service which the people demand, there should not be an attempt to niggardly withhold from the railways such revenues that may be necessary to furnish an efficient service and to acquire a surplus in order to preserve the stability and financial integrity of the properties. Every business has the right to demand this.

You, gentlemen of the Grain Dealers National Association, you particularly and the shippers of this country in general, are face to face with the greatest transportation shortage that has ever confronted this country, and the responsibility for this does not lie with the transportation companies. They cannot continue acquiring capital for further railroad construction or increased facilities with the situation that now confronts them. The freight rates for the last decade have been gradually decreasing and the operating ex-

penses, caused by the increased cost of material and advances of rates of pay to labor, have been expanded by leaps and bounds—not gradually. This is an open book and you can determine the facts for yourself by the examination of the annual reports of the railroads which are now being published for the last fiscal year, ending June 30th, 1912. It is a well-known fact that a few years ago where a shipper would show to a railroad traffic manager that some particular rate was out of line with the competitive conditions, that such a rate would be adjusted. Today this cannot be done, as the railroads are put on notice that they cannot advance any rate, therefore they will not voluntarily reduce a rate. The situation of the railroad that I represent is that it should, in order to meet its present and probable future requirements, place orders for ten thousand freight cars and one hundred and twenty-five locomotives, but I do not see my way clear to do this, as I cannot determine where the money would come from to pay for them. There should be a horizontal advance on every freight tariff for the entire country that is filed with the Interstate Commerce Commission. I make no exceptions, and you gentlemen representing one of the largest commodities for transportation should “stop, look and listen,” and lend your aid to a move of this character.

The Children of Israel, some thirty centuries ago, complained that they could not make brick without straw, nor can the railroads furnish the service that is now demanded unless public sentiment sustains their demand for larger revenue.

THE USE OF STATISTICS.¹

BY GEORGE L. BOAG.

Some form of statistical measurement of receipts has probably been used since the very beginning of railway working. With the natural growth of business, however, it became increasingly difficult to keep distinct accounts of working on different trains and sections, and a series of average figures has been gradually evolved. These averages, or statistical units, are calculated to show the results of the working of a number of trains or vehicles in a single figure which shall convey the information without recourse to a mass of detail. A list of the wagons loaded out of a busy goods station in a day, for example, would simply form a confused row of ciphers, but the sum of all the loads divided by the number of wagons gives in one figure the kernel of the information afforded by the list. This, then, is a "statistical unit" (the "average starting load"). The next step, and indeed the principal use of such an average, is to compare it with the similar figure for the previous day or days. The list of wagons could not easily be so compared, even though time allowed. When an average is obtained for a number of days or months, the figure is adopted as the standard, and the energies of the executive officer will be directed towards improving on the standard.

There are still people who distrust average figures, and who prefer to work on "rough ideas," perhaps derived from something like the aforesaid list of wagons, or from a daily inspection of warehouse and yard. Control by personal observation is admittedly most efficacious, but the busy superintendent or agent cannot be outside all day and every day, and average figures are therefore indispensable. Then again, there is the old grumble of "red tape" when statistics are mentioned. As a matter of fact, "red tape" is often nothing more or less than honest system, and to sneer at it betrays the casual man's dislike of order and regularity, and his fondness for "rule of thumb" methods and "rough ideas."

On the other hand, the student is warned against the indiscriminate conclusions which may be hastily drawn from a su-

¹ From "Manual of Railway Statistics," by permission of the *Railway Gazette*, London.

perfidious inspection of statistical units. He should understand the method of their compilation, the classification of the transactions going to make up the totals on which the average figures are based, and the defects inherent in compound units composed of a number of varying factors. In a few words the statistical unit intelligently applied is a very valuable instrument, but it is necessary to exercise the greatest care in its use, and conclusions should only be drawn from the indications given by several units used concurrently.

The recent report of the Departmental Committee, appointed by the British Board of Trade to make inquiries into the form of railway accounts and statistics, is an outcome of the general feeling existing in England for some years past that the statistics published by the English railways are not sufficiently comprehensive. The committee, in the course of its deliberations, heard and discussed evidence from many leading railway officials. One of the conclusions arrived at may be quoted: "The statistical returns at present furnished by railway companies to their shareholders under the Act of 1868 are very meager. . . . These returns do not appear to be framed upon any definite system, and the information which they contain is very incomplete." The committee finally recommended the adoption of a uniform set of accounts and statistics, and it is to be hoped that the manifest advantages of standardization, both in the system of statistics and in the form of accounts, will be recognized by the great English companies. The committee was divided in opinion on the subject of the ton-mile and passenger-mile, with their corollary statistics, and it was not considered desirable to recommend the compulsory publication of these units in view of the opinion expressed by the majority of the general managers in Great Britain against their adoption. The report carries two reservations, one signed by the three representatives of the railways, dissenting from the favorable view of an extended use of statistics, expressed in this report, and the other subscribed to by Messrs. Acworth, Paish and Peel (who represented the van of the reform party), not only recommending a schedule of additional statistics, but urging the compulsory publication of ton and passenger-miles. A summary of the report is printed in the *Railway Gazette*, page 849, Volume X.

Whatever be the eventual effect of the painstaking work of the committee, it is evident that a greater interest is now being taken

in statistics, and the present work is intended to meet to some extent the demand for information as to the compilation of the statistical units which it may be confidently prophesied will become in England as generally used as they are on railways in other countries.

Perhaps no single feature of railway operation, unless it be that closely allied one of rates and fares, has given rise to more discussion than that of the use of statistical units for the control of train working. Every responsible railway officer has his own idea as to the best methods of securing economy in operation, and nearly every administration consequently prepares a different set of statistics for this purpose. In the case of state-owned or subsidized railways, such as those of India and Australia, a statutory form of statistics has been laid down, and there is a certain uniformity in the periodical figures published. The same uniformity occurs to a large extent in continental countries, where there is a large degree of governmental control and inspection, and in the Argentine, where the form of accounts of many of the principal railways is derived from one original model. There is always, however, a divergence in practice and the published statistics are not invariably those used by the executive staff for the direct control of working.

Whatever system be used, the object is the same. A railway is usually said to manufacture and sell transportation, and like any other manufacturer it requires to know the cost of what it sells in order to measure its efficiency and prepare its rates. It has been said that the measure of efficiency is the amount of return produced on the capital employed, but the fallacy of this is shown by the example of a concern that is over-capitalized, requiring much larger net earnings on a given amount of business. A dividend alone, therefore, is not the only measure of economical working. In other words, it is not sufficient to impugn the management of a railway on the simple fact of its inability to produce a dividend, without taking into consideration the conditions affecting its operations; nor is it sufficient to accept as an indication of efficiency or otherwise the ratio of working expenditure to gross receipts, since the expenditure may be burdened with charges which do not arise out of the actual cost of working, such as interest on loans, reserve funds, etc.¹ Or the administration may be bound down by

¹ These are not included in working expenditure.

inadequate maximum rates which limit receipts to a figure that cannot fully remunerate the work performed and the obligations contracted.

The "train-mile" is the basis most generally used, especially in England, where this is practically the only statistical unit of comparison published by the railways under the present statutory form of accounts. Certainly the train-mile is a more reliable unit than the ratio of expenditure, and it is not sufficient to dismiss it as unpractical in face of the fact that the majority of the managers of railways in Great Britain, and some of those in India and elsewhere, maintain their faith in its reliability. At the same time, it is scientifically defective as a unit. The railway sells transport, and receives its earnings in return for the carriage of certain weight a certain distance. How it carries the weight is no concern of the trader who purchases the transport, or whether it be carried in one or several trains. "The intervention of a train for the purpose of the conveyance is, theoretically, no necessary part of its fulfilment."² The defect of the train-mile is that it is not a complete figure; a train may consist of 5 wagons or 50, of 50 tons or 500 tons, and may convey furniture or coal. An improvement in working, for example, in the better loading of wagons, might show an increased cost per train-mile, since the expenditure would be divided by fewer train-miles. Of course, if rates were maintained the receipts per train-mile would rise in a corresponding ratio, but the unit is none the less unsuitable for comparison, whether the comparison be made between two individual railways or between two periods. The train-mile is a variable unit and does not represent the same combination of conditions at different periods and in different places.

What is required is a unit which shall represent the work done, not in running a train of unknown composition, but in carrying a given weight a known distance, and this we have in the ton-mile, or for passenger traffic, the passenger-mile. Ton-mileage is the total of the tons carried one mile. It provides a unit comprehending the two factors of the transport sold, i. e., weight lifted and distance conveyed, and is undoubtedly the most scientifically comprehensive unit that can be adopted; it is indeed the only index which can be truly said to cover in a single figure the summarized result of the actual work of transport. Moreover, the ton-mile is

² R. L. Wedgwood, in *The Economic Journal*, March, 1909.

the basis of many other average figures, such as average loading per wagon and per train, average receipt, length of haul, etc., all of which have their uses. This fact has been often overlooked by railway officers in discussing the value of average statistics. It is not altogether the value of the ton-mile itself that has warranted its preparation, but the other units which form a part of it, or which are derivable from it, and which cannot be produced without it.

Certainly all these are average figures and must be used with caution, but, perhaps, too much emphasis has been laid on the objection to average figures. If the head of a department or general manager could possibly watch every detail of the service, he would not require those details to be summarized, but he cannot, and he must therefore fall back on averages; the larger the concern the more concentrated his averages. The manager of a "one man" railway 50 miles long, with 10 trains a day, can perfectly well maintain a daily watch on his train loads, etc., but on a larger railway, not only would it be impossible for the general manager to scrutinize such a large amount of detail, but it would be a waste of valuable time for him to attempt it. One is reminded of the president of an American railway who, in explanation of the entire absence of the usual litter of papers on his office table, said that his company paid him to think and not to work. One of the English methods quoted in the evidence before the Board of Trade Committee on Railway Accounts was a form showing the number of wagons less than the authorized load on every train on a given section for every day of the month. Now this form is very useful, but it contains an enormous mass of detail if it is intended to be read through by the general manager or his busy assistants. Some means ought to be possible of giving the gist, the essence, of such a form, in an easily checked total. A mass of figures generally has the effect of confusing the reader; the mind is temporarily glutted, as it were, and the true significance of the net result is overlooked. A statement such as the one referred to is obviously a useful one for the district superintendents, but it could also be checked weekly or monthly by the general manager through the medium of the "traction ton-mile" which, as distinct from the traffic ton-mile, is available within a few days after the end of the period it relates to, and can moreover be taken out for each train separately.

The passenger mile is not capable of such a wide range of application as the ton-mile, and its uses are limited, and depend largely upon circumstances. If a railway, as in England, has to run passenger trains for competitive or other reasons which render necessary a non-productive service, the passenger-mile in itself is not of much assistance. Like the ton-mile, however, it must not be considered on its own merits, but rather in the light of the value of the other units obtainable from it.

The cost per ton-mile and per passenger-mile is again a very debatable subject. It is true that any division of the cost of the numerous services which are common to the use of both freight and passenger traffic must be largely estimated and even empirical, but if the same formula be used from year to year, the inaccuracy is obviously present to the same extent in the figures compared.

While the figure of cost, therefore, is hardly suitable to compare one railway with another, owing to differences in the allocation followed, it is a reasonably exact figure for comparison between two periods of working on the same line, or on the same section of a line.

No consideration of these statistics would be complete without mention of the effect of their use on the staff. In fact it is possible that in many cases, even were the returns filed away in the management offices without attention, they would really have achieved their object. If a district superintendent be made to submit an average figure of working, whether it be daily, or weekly, or monthly, and whatever form the unit may take, and if he be made to compare it with the previous period and the same period in the previous year, and to explain the increase or decrease, it is bound to make him think and study his district. Glaring faults are obvious at the time, to the traveling inspector or stationmaster, but insidious faults go on for long unperceived. It is the insidious faults which affect average results, and which may therefore be detected at headquarters when they have passed unnoticed by the whole of the outside superintending staff.

TRAFFIC STATISTICS (RECEIPTS.)

Ton-mileage—Ton-mileage is weight, multiplied by distance, and the ton-mile is one ton carried one mile, or in other words the tonnage carried multiplied by the miles it has been hauled. For example, 10 tons hauled 10 miles are equal to 100 tons carried 1 mile, $10 \times 10 = 100$, or 100 "ton-miles." The two factors of weight

and distance are thus reduced to one compound unit. The combination of the two factors represents the work done, as in the case of a somewhat similar compound unit, the "foot-pound" in physics. There are many other definitions of the ton-mile, but the above is, perhaps, the most simple way of describing it. It is necessary thoroughly to understand the nature and use of this unit, as there are many other statistics derived from it and used in combination with it.

There has been a vast amount of discussion of late years as to the value of ton-mile statistics, and a large part of the evidence taken before the Board of Trade Committee on Railway Accounts and Statistics turned on the applicability, or otherwise, of these statistics to English railways. Practically all the railways in the world, outside the British Isles, compile ton-mile statistics. The one exception in England is the North-Eastern, where ton-miles have been compiled now for some ten years. The North-Eastern officials have repeatedly pronounced in favor of the use of ton-mile statistics. Mr. Wedgwood says, "It seems impossible to come to any other conclusion than that for railway work the units, both of product and of work done, must in theory be the ton-mile and the passenger-mile." Sir George Gibb, in his evidence before the Board of Trade Committee, said: "The opponents of ton-mile statistics seem to me to suggest for them uses and merits which they cannot possess and which, so far as I am concerned, I have never claimed for them in anything I have said or written on the subject, nor have I ever made the slightest approach to a suggestion that ton-mile statistics could or should displace other working statistics. Ton-mile statistics are, in my judgment, essential. I know of no equivalent or substitute for them." Some of the leading officials on the Indian railways were even more emphatic on the subject, and Sir Alexander Rendel, who introduced ton-mile statistics into India in 1870, says: "I am therefore justified in saying that Indian experience fully confirms American, namely, that ton-mile statistics, or some equivalent for them, are absolutely necessary to effective railway management." On the continental railways (none of whose representatives seems to have been invited to give evidence before the Committee on Accounts and Statistics), the ton and passenger-mile statistics are considered of the greatest importance. Moreover, the continental newspapers, in reporting the financial results of railway working, invariably quote the receipts per ton

and passenger-mile. It is evident, therefore, that there is a very large consensus of opinion in favor of the preparation and use of these statistics. On the other hand, all the English railways, with the exception of the North-Eastern, have declared against them, on the ground that (1) ton-mile statistics are not available until long after the date to which they refer, they would not usefully supplant existing statistics, and the large cost of their preparation would not there be justified; and (2) ton-mile figures are misleading, and might give away information to competitors or convey a wrong impression to the public. Other railway officers in India and Argentina have stated even that although their railways compile ton-mile statistics, they personally do not use them, but in some cases these gentlemen have admitted that they did make use of some of the units which are obtainable only from those statistics, such as average haul, average loading, etc.

Attention may be drawn again here to the fact that the term "ton-mile statistics" is a general term covering not only ton-mileage itself but many other units. When once the ton-mile is obtained a large number of other very important data are available with very little extra trouble. All the following units are formed from the ton and passenger-mileage:

Number of ton miles.

Number of passenger miles.

Average train-load.

Average wagon-load.

Average number of passengers per train.

Average number of passengers per coach.

Average length of haul, goods.

Average length of journey, passengers.

Average rate per ton-mile.

Average rate per passenger per mile.

Density of traffic.

These units will be described in the present chapter.

Passenger-mileage—The "passenger-mile" is one passenger carried one mile and the computation of passenger-mileage is exactly similar to that of the ton-mileage. Ten passengers booking to a station 10 miles distant are equal to 100 passenger-miles. Passenger-mileage is therefore the number of passengers carried one mile.

In the references above to the value of ton-mile statistics these have been generally understood to include passenger-mileage. Nev-

ertheless, a distinction must be drawn between ton-miles and passenger-miles, as it is admitted that the latter have not the same sphere of usefulness as the former, nor the same amount of reliability. Booked trains have often to be run whether there be a paying load of passengers or not, and therefore the passenger-mile is not always the true criterion of the work done. One of the arguments in favor of the train-mile is that as regular trains have perforce to run, with or without a paying load, the train-mile is the measure of service performed, which is true to this extent of passenger traffic, that it is possible for an advertised train to run entirely without passengers, and the passenger-mileage would be *nil*, whereas the train-miles run would still figure as a record of the service, independently of the number of passengers, which it is often impossible for the administration to increase. The case of a train running without any passenger-miles is of course an exaggeration, but it also furnishes an answer to the train-mile argument, for just as the train-mile counts independently of the load of the train, so does it fail to give an exact indication of the useful work of that train. The example serves to emphasize the necessity for the concurrent use of two or more statistical units, in order to obtain an intelligible reading of the results recorded.

Compilation of Ton and Passenger-Mileage.—A striking feature of the discussions that have taken place on this subject has been the extraordinary difference in the opinions expressed of the cost of compiling ton-mile statistics. One of the principal objections of the railway companies in Great Britain to the adoption of ton-miles is the cost of compilation, which was first estimated at £15,000 per annum for the North-Western alone. Fortunately there is the experience of the North-Eastern to provide exact figures. Their statistics office costs altogether £3,000 a year, of which £1,000 are directly attributable to the compilation of ton-mileage. A similar figure is quoted for the East Indian Railway, and also for the Grand Trunk Railway of Canada. There appears to be no reason why other railways should have to exceed this figure to any great extent, and in the case of the North-Eastern it only forms .07% of the total goods and mineral receipts.

The principal difficulty in the way of ton-mile statistics in England is the large proportion of traffic running over other companies' lines, and this is always quoted as an almost insuperable difficulty in the way of compiling ton-miles. It is certainly an important

factor, as in no country in the world is there such a complication of running powers, joint lines and other special arrangements for exchanged traffic, as in Great Britain. This admittedly will make the compilation of ton-mileage more difficult and more costly, but probably not to the extent that has been stated. The cost of computing the ton-mileage of the "through-through" traffic (i. e. traffic passing over an intermediate line from and to foreign stations beyond its junctions) by the Railway Clearing House, has been estimated at from £3,000 to £4,000 a year, say £250 a year each for the 15 principal companies. Probably the companies would do it much cheaper themselves.

There is an important point in connection with all these statistics, and which especially affects the cost of compilation of ton-mileage. It seems to have been taken for granted in England that the ton-mileage should be compiled in the accounts office from duplicates of the invoices or from abstracts sent in monthly from the stations, and it would appear that this is the method followed in India, and on the North-Eastern, but on the continental lines a large part of the work is done by the stations. There seems to be no reason why it should not be done in England in the same way. As each consignment is invoiced the shipping clerk multiplies the weight by the distance, and inserts in a column provided for the purpose on the invoice the corresponding ton-mileage. These ton-mile figures are abstracted at the same time as the charges, and the totals of the forwarded abstracts give the total ton-mileage between the forwarding point and the other stations to which goods have been shipped.

STATISTICS OF RAIL MANUFACTURE.

BY PAUL M. LA BACH.

Assistant Engineer, Chicago, Rock Island & Pacific.

At this time, when the rail question is receiving a great deal of attention, the following statistics of the production and importation of rails in this country is of interest:

PRODUCTION OF IRON, OPEN HEARTH STEEL AND BESSEMER STEEL RAILS IN THE UNITED STATES, TOGETHER WITH THE PRICES AT PITTSBURGH FOR IRON AND BESSEMER STEEL RAILS; ALSO IMPORTATION OF IRON RAILS.

Year	Bessemer Steel Rails		Iron Rails		O. H. Steel Rails in Gross Tons	Imports of Iron Rails in Gross Tons
	Gross Tons	Price per Ton	Gross Tons	Price per Ton		
1840	.....	.....	.....	.....	.....	29,092
1841	.....	.....	.....	.....	.....	23,253
1842	.....	.....	.....	.....	.....	24,970
1843	.....	.....	.....	.....	.....	9,655
1844	.....	.....	.....	.....	.....	15,577
1845	.....	.....	.....	.....	.....	21,812
1846	.....	.....	.....	.....	.....	5,897
1847	.....	.....	.....	\$ 69.00	.....	13,537
1848	.....	.....	.....	62.25	.....	29,489
1849	.....	.....	21,712	53.88	.....	61,753
1850	.....	.....	39,360	47.88	.....	142,037
1851	.....	.....	45,141	45.63	.....	188,626
1852	.....	.....	55,784	48.38	.....	245,625
1853	.....	.....	78,450	77.25	.....	298,995
1854	.....	.....	96,443	80.13	.....	282,867
1855	.....	.....	123,816	62.88	.....	127,516
1856	.....	.....	160,730	64.38	.....	155,495
1857	.....	.....	144,570	64.25	.....	179,305
1858	.....	.....	146,171	50.00	.....	75,745
1859	.....	.....	174,513	49.38	.....	69,966
1860	.....	.....	183,070	48.00	.....	122,175
1861	.....	.....	169,480	42.38	.....	74,490
1862	.....	.....	190,993	41.75	.....	8,611
1863	.....	.....	246,221	76.88	.....	17,088
1864	.....	.....	299,463	126.00	.....	.....
1865	.....	.....	318,118	98.63	.....	.....
1866	.....	.....	384,623	86.75	.....	.....
1867	2,277	\$166.00	410,319	83.13	.....	.....
1868	6,461	158.46	445,972	78.88	.....	.....
1869	8,616	132.19	521,372	77.25	.....	.....
1870	30,357	106.79	523,214	72.25	.....	.....
1871	34,152	102.52	658,467	70.38	.....	.....
1872	83,991	111.94	808,866	85.13	.....	.....
1873	115,192	120.58	679,520	76.67	.....	.....
1874	129,414	94.28	521,848	58.75	.....	.....
1875	259,699	68.75	447,901	47.75	.....	.....
1876	368,269	59.25	417,114	41.25	.....	.....
1877	385,865	45.58	296,911	35.25	.....	.....

Year	Bessemer Steel Rails		Iron Rails		O. H. Steel Rails in Gross Tons	Imports of Iron Rails in Gross Tons
	Gross Tons	Price per Ton	Gross Tons	Price per Ton		
1878	491,427	\$42.21	288,295	\$33.75	8,390	.....
1879	610,682	48.21	375,143	41.25	8,168	.....
1880	852,196	67.52	440,859	49.25	12,157	.....
1881	1,187,770	61.08	436,233	47.13	22,515	.....
1882	1,284,067	48.50	203,459	45.50	20,325	.....
1883	1,148,709	37.75	57,994	.....	8,202	.....
1884	996,983	30.75	22,821	.....	2,384	.....
1885	959,471	28.52	13,228	.....	4,279	.....
1886	1,574,703	34.52	21,142	.....	4,692	.....
1887	2,101,904	37.08	20,591	.....	17,145	.....
1888	1,386,277	29.83	12,725	.....	4,698	.....
1889	1,510,057	29.25	9,159	.....	2,988	.....
1890	1,867,837	31.78	13,882	.....	3,588	.....
1891	1,293,053	29.92	8,240	.....	5,883	.....
1892	1,537,588	30.00	10,437	.....	3,819	.....
1893	1,129,400	28.12	6,090	.....	968	.....
1894	1,016,013	24.00	4,674	.....	1,085	.....
1895	1,299,628	24.33	5,810	.....	697	.....
1896	1,116,958	28.00	4,347	.....	705	.....
1897	1,644,520	18.75	2,872	.....	500	.....
1898	1,976,702	17.62	3,319	.....	1,220	.....
1899	2,270,585	28.12	1,592	.....	523	.....
1900	2,383,654	32.29	695	.....	1,333	.....
1901	2,870,816	27.33	1,730	.....	2,093	.....
1902	2,935,392	28.00	6,512	.....	6,029	.....
1903	2,946,756	28.00	667	.....	45,054	.....
1904	2,137,957	28.00	871	.....	145,883	.....
1905	3,192,347	28.00	318	.....	183,264	.....
1906	3,791,459	28.00	15	.....	186,413	.....
1907	3,380,025	28.00	925	.....	252,704	.....
1908	1,349,153	28.00	71	.....	571,791	.....
1909	1,767,171	28.00	.....	.....	1,256,674	.....
1910	1,884,442	28.00	230	.....	1,751,359	.....
1911	1,138,633	28.00	.....	.....	1,676,923	.....

STATISTICS OF AMERICAN RAILWAYS

FOR THE YEAR ENDING JUNE 30

1912

PREPARED BY

SLASON THOMPSON

DIRECTOR OF THE BUREAU OF RAILWAY NEWS AND STATISTICS

INTRODUCTORY

THE RAILROADS TODAY are dealing with the greatest economic problem before this country. The United States is trying out an experiment that has never yet been worked out successfully in any country of the world. It is trying to work out the problem of controlling railroads built and maintained by private capital, but which are under regulations which are fixed and controlled by the public. This has never yet been worked out to an end.

While the State Commissions and the Interstate Commerce Commission can make reasonable rates and regulate schedules for the running of trains, the point is whether this can be done so as to bring in the new men and the new capital necessary for the building of new systems, and the further development of the present ones.—Hon. Chas. A. Prouty, Chairman, Interstate Commerce Commission at the opening of the annual meeting of National Association of State Railway Commissions, Washington, D. C., Nov. 19, 1912.

“There’s the rub.” Chairman Prouty has placed his finger upon the very ganglion of the troubles that perplex the American railway world today. If these troubles concerned only railway managers and railway capital, the American public might watch their solution with equanimity. But they involve a great “economic problem” that reaches every political, social and industrial interest in the country. Behind them stalks Government Ownership with all its potentialities for evil and not one well-grounded promise of social safety or financial success.

Now what are Commissioner Prouty and his colleagues of the federal and state commissions doing to so regulate the railways as to bring in the new men and new capital so necessary to their maintenance, extension and development?

The year has been one of abounding reassurance—in words and ending in words.

Speaking at Portland, Oregon, a year ago last October, President Taft said, “Let us treat the railroads as a part of the community

entitled to adequate compensation for services rendered. Don't let us encourage attacks on the railroads just because they are railroads. There is an immense number of wage-earners dependent on the railroads for support; there is a great number of shippers dependent upon them.

"Let us treat the railroads as a part of our civilization, and when we find a man who is trying to claim political power just by condemning the railroads, let us visit him with the condemnation he deserves. Let us leave the railroads to work out their salvation under the law. Let us take them out of politics and make them stay out of politics."

In an address before the National Hay Association last July, Chairman Prouty used these words: "No man can foretell whether in the years to come it will be or it will not be necessary to allow some increases in the transportation charges of our railroads. If that time comes, it will be the duty of the Commission to permit that advance. It will not only be its duty as an act of justice, but it would be its duty to you in the highest conservation of your interests."

As long ago as February, 1911, in his opinion in the Western Advance Rate Case, Commissioner, now Chairman, Lane of the Interstate Commerce Commission declared that "Some method must be found under which a carrier, by its own efficiency of management, shall profit. A premium must be put upon efficiency in the operation of the American railroad."

In the face of these warnings and protestations, what have we?

To the railways of the United States the year 1912 has brought:

- The lowest average freight receipts since 1900,
- The highest wages in their history,
- The multiplication of costly regulation,
- The heaviest loss and damage claims on record,
- The highest taxes yet levied,
- The largest gross revenues received,
- The largest expenses of operation paid, all resulting in
- The lowest relative *net* income in 25 years.

No wonder President Hadley of Yale, one of the wisest students of railway affairs in the world, was led to exclaim before the New Haven Chamber of Commerce last January:

"I am afraid that neither the public nor the Government is awake to the real state of things. In our endeavors to control corporations we too often try to lessen their efficiency instead of increasing it. We are appalled by a railway accident, and we suggest that every engine should have two engineers instead of one. A fast train runs off the track, and a government officer suggests that people ought not to want to travel so fast. If these views prevail, the day of America's greatness is done."

REGULATION AND STATISTICS IN 1912.

For the details of the railway situation in 1912, so far as statistics can reveal them, the reader is referred to the succeeding pages of this pamphlet. Uncolored by the writer's opinions, these tell a marvelous tale of railway efficiency which no easy chair theories can discount. If, as most likely is the case, the reader has been under the impression that American railways are over-capitalized, he will find that they are capitalized so low as to excite incredulity among foreign observers. He will find them equipped with engines and cars of such power that only roadbeds twice as strong as European roadways could carry them. He will find that their passenger fares are reasonable relatively to the accommodations and conveniences afforded and that their freight rates are little more than half those of the boasted state roads of Europe. And no doubt the reader will be surprised to find that in the matter of railway accidents there is little to choose between the safety of railway travel here and abroad.

But possibly the reader is more interested in the great and really grave "economic problem" presented by railway regulation to which Chairman Prouty referred in welcoming the State Commissions to Washington. In some respects this is beginning to impose on the railways the task put upon the Israelites by Pharaoh, who denied them straw to make brick but required them to gather it themselves without diminishing the tale of bricks. Pharaoh was a great regulator, but his hosts perished in the Red sea.

Under regulation as interpreted to mean only reduction of rates to meet the views of rival shippers and communities, and suspending all advances except an insignificant few, the average receipts per freight ton mile has been reduced to *7.41 mills* from *7.57* in 1911. This may not appear to be a back-breaking drop. But applied to a movement of over 267 billion tons of freight moved one mile it mounts up to over \$42,000,000, or enough to have removed the re-

proach of insufficient net income from a year of unprecedented accomplishment.

The real cause for this condition is not to be found in the statistics of the railways, but in the statistics of the Interstate Commerce Commission. During the year it has heard and decided 375 rate cases, of which 243, or 65%, granted reduction, reparation or declared the existing rate unreasonable, leaving 132 cases in which the complaint was dismissed, with no advantage to the railways.

In the following statement the decisions are distributed among the Commissioners rendering the opinions into dismissals and reductions or reparations:

Opinions by—	Dismissing complaints.	Granting reparations or reductions.
Chairman Prouty.....	6	34
Commissioner Clements.....	8	9
“ Lane.....	12	18
“ Clark.....	5	16
“ Harlan.....	5	14
“ Meyer.....	4	16
“ McChord.....	2	17
By the Commission.....	90	119
	<hr/>	<hr/>
Total	132	243
Percentage	35.2%	64.8%

During the past four years the consistent attitude of the Commission toward the railways in the matter of reducing rates is shown in the following record of dismissals since this Bureau began its annual survey:

Year.	—No. of Decisions.—			
	Dismissing complaints.	Per cent.	Granting reparations or reductions.	Per cent.
1909.....	138	39.7	219	61.3
1910.....	138	41.1	198	58.9
1911.....	93	37.4	156	62.6
1912.....	132	35.2	243	64.8
	<hr/>	<hr/>	<hr/>	<hr/>
Total.....	501	38.0	816	62.0

It is possible that any industry already selling its chief commodity 50% below the average of the rest of the world could long survive such a stream of undermining reductions, but nature and the experience of mankind do not base stability on any such process.

Contemporaneous with the 243 deliberative decisions just mentioned reducing the rates, the Commission entered no less than 3,332 "Informal Reparation Orders," including 271 coming under the head of "Unreported Opinions," all tending to deplete railway revenues.

Now what has the Commission done to counteract the effect of these reductions and reparation orders? The world knows what it did in February, 1911, with the Advance Rate Cases; and the statistics of railways since have shown the pitiful aftermath of these decisions. Since then hundreds of tariffs advancing rates have been filed, hundreds have been suspended, and the formal decisions of the Commission show two score of the suspensions have been vacated.

The Traffic World and Bulletin, which is a quasi organ of the Commission, publishes a weekly statement of new tariffs filed, including a brief summary of "suspended tariffs." As the reader probably knows, the Commerce Act, as amended in 1910, gives to the Commission authority "upon complaint or upon its own initiative without complaint" at once to enter upon a hearing of any new schedule filed with it, and to suspend the operation of such schedule first for 120 days and at its discretion for a farther period not exceeding six months. Under this provision the "suspended tariffs" as published in the *Traffic World* during the year 1912 numbered no less than 921. Of these at least one-half were extensions. For instance, the issue of January 11, 1913, contained summaries of 41 suspensions, 26 of which read that such and such a schedule which was previously suspended to say December 31st is "hereby further suspended until June 30." One tariff may cover from one to a thousand items.

As the schedule can only be suspended twice, it is fair to assume that the tariffs suspended in 1912 numbered close on to 450. Of these, to be on the safe side, we will say half were advances, and whether the suspensions were finally vacated or not, the roads filing them were kept out of the much needed increase they proposed for at least 10 months, with no redress or possibility of recouping the

loss. Under the law the Commission has little discretion in the matter of preliminary suspensions, but "it could and it would" put some restrictions on the six-months extensions. The law saddles the railways with the burden of proof after a hearing is commenced, but the exercise of the authority to suspend is not, in the writer's view, mandatory.

THE ENGINEER'S ARBITRATION AWARD.

Important beyond any other single occurrence in transportation matters during 1912 was the award of the Commission chosen to arbitrate the differences between the Brotherhood of Locomotive Engineers and fifty-two railroads operating east of Chicago and north of the Ohio and Potomac rivers. The public has been given the benefit of the criticisms of this award from the employes' point of view in the minority report made by Mr. P. H. Morrissey, representing the Engineers on the Board. It is unfortunate that Mr. Daniel Willard, who represented the railways on the Board, felt constrained to concur in the report without some public statement of "the findings in detail," which did not meet his approval, as explained in a note to the report. His acceptance, for the roads involved, of the conclusion reached "without question," renders anything herein set down merely *obiter dicta* of an American citizen interested in the correct solution of the grave "economic problem" referred to in Chairman Prouty's address to the Convention of State Commissioners.

After several months of conferences, the parties above mentioned agreed to a form of arbitration that involved the appointment of their respective representatives as named and of five other arbitrators chosen, from lists submitted, by Chief Justice White of the Supreme Court, Judge Knapp of the Commerce Court, and Commissioner of Labor Neill. The five so chosen were Hon. Oscar S. Strauss of New York, Dr. Chas. R. Van Hise of Madison, Wisconsin, Mr. Frederick N. Judson of St. Louis, Dr. Albert Shaw of New York, and Mr. Otto M. Eidlitz of New York. With the two representatives of the parties to the controversy mentioned they constituted the Board of Arbitration, which held protracted hearings at the Oriental Hotel, Manhattan Beach, N. Y., from July 15th to July 27th.

Although pretty nearly every phase of the conditions of employment between the railways and their engineers in the territory

involved was gone into, including standardization of service and the introduction of new rules, the hearings never got far away from the questions whether the engineers were entitled to more pay, if so, how much more, and whether the railways should advance wages irrespective of their financial ability to do so.

Evidence was submitted as quoted in the decision of the Board showing that under the existing rates of pay engineers for specimen months on twelve roads earned from \$167.56 up to \$266.15 per month and for seven consecutive months on the same roads had averaged from \$162.71 up to \$237.37 per month.

Twenty-five engineers testified before the Board. The compensation actually received by these annually was \$1,200 for the lowest, \$2,386.60 for the highest, and \$1,666.80 as the average. The Board found that the average annual earnings of all engineers for the territory could not certainly be assumed to be more than \$1,400. Figures to this Bureau for the three I. C. C. Groups covering the same territory indicate that it was over \$1,520. The Board assumed 300 as the "normal days worked" in a year, when the normal engineer is paid for working more nearly 320 days by reason of "overtime," and overtime does not always mean over 10 hours. The average pay for the United States as a whole is nearer the \$1,666.80 average of the 25 engineers examined than the average of \$1,400 as assumed.

The Board, while finding that the tables of compensation of railway employes compiled by the Interstate Commerce Commission do not afford "a basis for accurate comparison," yet very properly adopts them as the only ones available for comparisons of the wages paid in different sections of the United States. It might have gone further and declared that in spite of the difficulties attending the compilation of official tables they are the best that have been evolved and through their continuous uniformity reflect with remarkable sensitiveness the changes that have taken place in railway compensation during the past twenty years. If the Commission required the companies to report the average number of employes on their monthly pay rolls instead of June 30th each year, these tables would be still more valuable.

The Board finds that the absolute increase in the average daily compensation of the engineers has been somewhat greater than the

increase for the firemen, but not relatively. It also found that the facts presented to the Board showed that the locomotive engineers have had several increases in wages since 1900, "especially in 1903, 1907 and 1910."

The facts submitted to the Board on behalf of the engineers related almost wholly to the high class of the service rendered, its heavy and increasing responsibility, its skill and efficiency, the severity of the apprenticeship, the mental strain and unusual degree of hazard; all of which have been recognized in the comparatively high pay engineers in the United States have always received and also in the several increases noted by the Board up to and including 1910.

Strangely enough no stress was laid on the increased cost of living, which is the common plea of less highly paid labor. The point, however, was covered in the claim that the wages of engineers had not kept pace with that of other classes employed in train service.

Beyond showing that engineers constitute the highest paid class of employes in their service and were as well paid, if not better paid, than labor in other employments, the railways practically rested their case on proof that in view of their revenues they were unable to pay increased wages.

After holding the case under advisement for over three months, the Board cut the Gordian knot involved in the different classes of advances demanded on many classes of engines and conditions of service and a score of questions respecting different questions on fifty-two roads, by imposing the following minimums on all, irrespective of their ability to pay:

PASSENGER RATES: The minimum passenger rates for engineers shall be \$4.25 for 100 miles or less; miles made in excess of 100, pro rata. Overtime in through passenger service is to be computed on the basis of 20 miles per hour and will be paid for at the rate of 50 cents per hour. Overtime is to be computed on the minute basis.

FREIGHT SERVICE: The minimum freight rate for engineers shall be \$4.75 for ten hours or less, or 100 miles or less; miles made in excess of 100, pro rata. Overtime in freight service is to be computed on the basis of 10 miles per hour, and paid pro rata on the minute basis.

Twenty-five cents 100 miles or less is to be added for local freight service to through freight rates according to class of engines. Miles over 100 will be paid pro rata. Through freight rates will apply on all work, wreck, pusher, or helper, mine runs or roustabout circus trains, and to trains established for the exclusive purpose of handling milk; all according to class of engines; overtime to be computed on minute basis.

SWITCHING SERVICE: Engines in switching service shall be paid at a minimum rate of \$4.10 per day, 10 hours or less to constitute a day's work; all time over 10 hours to be paid pro rata; overtime to be computed on minute basis; time to begin when required to report for duty and to end at the time engine is placed on designated track or engineer is relieved at terminal.

All of these minimums were awarded "without prejudice to existing higher rates on different classes of engines." None of the other features of the award relating to hours and conditions of service tend to lighten the burden of these minimums.

Their sweeping nature may be judged from the fact that the \$4.25 passenger minimum, irrespective of the 50 cents overtime allowance, hits the rates of 46 out of the 52 roads involved, on some of which the rate was as low as \$2.45, the majority ranging between \$3.90 and \$4.20. The \$4.75 freight minimum strikes thirty-three of the roads, whereof some had a rate as low as \$4.10. The 25 cents additional for local freight is general, according to class of engines.

Upon what principle the Board arrived at the adoption of "the principle of imposing a minimum" for the engineers, except as one step toward "establishing a uniformity of rates of pay by introducing a minimum wage for each of the classes of service," does not appear. To the writer, as to Mr. Morrissey in his minority report, there seems no justification in determining the questions involved in this arbitration "by the application of the so-called minimum rate."

In any true economic sense a minimum wage rate must consider two things—the least compensation necessary to maintain the employe in a condition of mental and physical efficiency for the service tendered, and the most the employer can profitably pay for that service. When the employer pays less than the former, he has crossed the line of justice and safety; when the employe demands more than the latter, he imperils the solvency of the industry that pays his wage. In the vocabulary of efficiency there is no such word as minimum. It stands in the jargon of economists as the least pay that will keep the least efficient alive.

In the arbitration under review, the writer does not understand that any claim was made that the engineers were not already receiving what is known as the sustenance minimum wage. The proof before the Board was that their pay was "almost double that of the telegraphers and despatchers, more than double that of station agents, and 52% greater than machinists and 88% greater than carpenters." Why should there be a different minimum wage for firemen and engineers in a mere sustenance sense? Firemen

are the mental, physical and moral stuff engineers are made of. The difference in pay merely expresses the difference in responsibility put upon the same individual equipment. The maximum for firemen does not approach the minimum imposed for engineers.

In dealing with the ability of the eastern railways to make any general wage increases, the Board digressed into a general discussion of railway finances in which all the stock references to over-capitalization, watered stock, intercorporate relationships, interlocking directorships, the so-called "system," the value of railway property and the proper compensation to capital. It wound up by quoting the exploded table of the Interstate Commerce Commission through which Commissioner Lane was deluded into denying the increases in rates asked in the Western Advance Rates Case. That table, it will be remembered, was presented at the hearing by the Commission's attorney and was accepted as reliable by the Commission. It stated that in 1910 dividends to the amount of \$405,131,650 had been paid on 67.20% of all railway stock, being an average rate of 7.47% on the same. The statement was made in such a form as to deceive Commissioner Lane, and through him the general public. And no exposure seems equal to prevent its recrudescence wherever the question of railway wages and rates is discussed.

Here are the facts in regard to this fictitious 7.47% dividends of 1910 as they appear in the text of the Commission's Statistics for that year:

Dividends declared from current income.....	\$207,371,858
Dividends declared out of surplus.....	86,465,005
Dividends declared out of "dividends receivable".....	111,282,500

Even this is not so ingenuous as it looks. It conceals the fact that \$78,442,027 of the income out of which the first item was "declared" was "clear income from investments."

In cold fact there was only \$2,750,667,435 operating revenues in 1910 to be distributed. Of this \$1,822,962,675 went to operating expenses, \$490,408,265 to taxes and fixed charges, \$99,870,685 to appropriations for betterments and "other deductions," and \$117,030,974 was set aside for "surplus," leaving only \$220,394,836 for dividends and deficits of weak lines.

Some day the Commission will formally repudiate and denounce the whole system of statistics that befores its study of railway finances with intercorporate holdings and duplications and triplications of dividends. The Engineers' Board of Arbitration is scarcely to blame for being misled in this particular.

In making its awards, however, the Board eliminated the claim of the railways that they were unable to pay an increased compensation because, "If they are not able to pay such compensation with existing rates, there is just cause for them to open again the question of an increase of rates with the Interstate Commerce Commission." The railways have tried leaning on that reed and are still suffering from "pierced hands."

As a matter of fact this crucial test of the principle of arbitration was not decided on the issues before the Board at all. Neither was it decided on its merits. The minimums imposed were not arrived at through any process of deduction that found that the engineers were entitled to them as irreducible minimums or because the railways could afford to pay them. The award on almost every page shows that the Board was possessed and oppressed with the thought that it was charged with the impossible duty of finding a peaceful solution of the conflict between capital and labor engaged in a vast public utility. It dwelt with reiterated emphasis upon the disastrous results that would follow a strike of railway engineers in such a vast territory as was involved in this arbitration, and pictured how "military forces, both state and national," would have to be called in to preserve the peace. It was in avoidance of the strike threat that the question was submitted to arbitration at all.

In a striking paragraph the Board summed up its view of the situation thus:

"In the opinion of the Board, the balance of power in the control of wages, which was first with the railroads, has now passed to organized labor. The railroad operators, under the control of national and state commissions and under the control of public opinion, are weaker than strongly organized unions. The latter, without any control through commissions, are, of course, also affected by public opinion, but not so directly."

And therefore in deference to the demands of the stronger the Board imposed increased burdens on the weaker party in the great economic struggle for the same reason that led the latter to accept arbitration at all. Then the Board proposed the formation of a Wage Commission to deal with similar controversies, which would be a happy way out of all our troubles if such commissions could be invested with authority to make their awards binding on labor as well as on capital, and when they ordered advances in wages provide the ways and means to meet them. The difficulty with the commissions suggested by the Board would be that they would be influenced by the same dread of a strike that dictated its own findings.

RECORD REVENUES AND EXPENSES IN 1912.

In making its award the Board in the Engineers' Arbitration case was dubious of the collateral effect of the advances granted, saying that it was improbable that they "would amount to more than \$60,000,000," as if sixty millions were scarcely worth considering. Writing toward the end of October, 1912, it was in a position to anticipate that "the gross income of the railroads during the fiscal year 1912-13 will be larger than in 1911-12." Unfortunately, railway managers have long ago learned not to put their faith in "gross income," used in the sense of "gross revenues." They know that it takes "record" expenditures to earn "record" revenues and their experience in the past has not been disproved by what they are experiencing now.

The calendar year 1912 affords a fresh illustration of big promises in gross revenues converted by heavy expenses into disappointing fulfilments in net. The monthly reports to the Interstate Commerce Commission for the year ending Dec. 31, 1912, show that the revenues of the railways of the United States for the first time on record exceed three billion dollars (\$3,036,076,418). They also show that for the first time on record the expenses are over the two billion mark (\$2,092,297,214, or including taxes, \$2,217,050,449).

On the following pages are presented the data from these monthly reports of the income accounts of the railroads for the years named in the tables back to 1907. The first table gives the summary of gross earnings for the calendar years 1907, 1908, 1909, 1911 and 1912, by months.

SUMMARY OF GROSS OPERATING REVENUES OF THE RAILWAYS OF
THE UNITED STATES DURING THE CALENDAR YEARS 1907 TO 1912
(OMITTING 1910), BY MONTHS AND HALF-YEARLY DIVISIONS.

	1907	1908	1909	1911	1912
Average Mileage	227,000 (thousands)	231,584 (thousands)	234,950 (thousands)	244,182 (thousands)	248,007 (thousands)
January.....	\$ 199,000	\$ 173,611	\$ 183,264	\$ 215,292	\$ 212,318
February.....	178,300	161,085	174,574	199,507	219,831
March.....	211,700	183,509	205,838	227,565	239,864
April.....	214,800	175,071	197,024	218,489	222,202
May.....	224,800	174,527	201,596	229,853	235,267
June.....	223,000	184,047	210,182	231,980	246,788
Half Year....	\$1,251,600	\$1,051,853	\$1,172,481	\$1,322,686	\$1,376,273
July.....	\$ 228,672	\$ 195,245	\$ 220,351	\$ 231,688	\$ 255,152
August.....	241,303	206,877	236,982	253,043	278,176
September....	234,386	219,013	246,335	257,257	277,015
October.....	250,575	233,105	260,821	266,064	301,708
November.....	230,445	211,281	247,564	248,302	280,515
December.....	194,304	205,455	222,692	238,109	267,235
Half Year....	\$1,369,688	\$1,270,978	\$1,434,747	\$1,494,463	\$1,659,803
Total.....	\$2,621,288	\$2,322,831	\$2,607,228	\$2,817,149	\$3,036,076
Decrease from Preceding Year		\$298,457	.....	\$24,550	.....
Increase over Preceding Year .....		.....	\$ 284,397	.....	\$218,927
Revenue per mile of line....	\$ 11,547	\$ 10,034	\$ 11,099	\$ 11,542	\$ 12,242

Note.—Operating revenues 1910, \$2,841,699,000; revenue per mile of line \$11,865.

The next table gives the summary of the operating expenses of the same roads for the calendar years 1907, 1908, 1909, 1911 and 1912, by months.

SUMMARY OF OPERATING EXPENSES OF THE RAILWAYS OF THE UNITED STATES FOR THE CALENDAR YEARS 1907 TO 1912 (OMITTING 1910), BY MONTHS AND HALF-YEARLY DIVISIONS.

	1907 (thousands)	1908 (thousands)	1909 (thousands)	1911 (thousands)	1912	Ratio to Revenues (1912)
January.....	\$134,225	\$132,502	\$132,772	\$161,548	\$ 165,904,134	77.62
February.....	121,500	123,773	125,333	149,639	162,095,314	73.75
March.....	142,425	128,200	136,179	158,355	170,334,059	71.03
April.....	144,990	124,284	134,615	153,720	164,014,641	73.81
May.....	151,740	123,932	135,879	159,918	168,242,103	71.51
June.....	150,525	124,208	136,138	159,186	170,282,620	69.00
Half Year.....	\$845,405	\$756,902	\$800,918	\$942,366	\$1,000,872,871	72.72
Ratio.....	67.7%	72%	68.31%	71.25%		
July.....	\$152,992	\$127,978	\$141,894	\$158,016	172,354,990	67.55
August.....	156,337	131,557	146,465	164,460	178,417,393	64.14
September.....	156,631	137,155	150,886	164,374	178,278,390	64.36
October.....	166,999	144,195	156,720	169,978	191,192,708	63.37
November.....	154,150	136,809	153,181	166,675	186,654,671	66.54
December.....	142,631	136,867	154,224	163,980	184,526,191	69.05
Half Year.....	\$930,242	\$814,563	\$903,372	\$987,483	\$1,091,424,343	65.76
Ratio.....	68%	64.1%	62.98%	66.10%	65.76%	
Total.....	\$1,775,647	\$1,571,465	\$1,704,290	\$1,929,849	\$2,092,297,214	68.91
Ratio.....	67.8%	67.7%	65.37%			
Decrease from Preceding Year...		\$204,182		\$1,323		
Increase over Preceding Year...			\$132,825		\$162,448,214	
Expenses per Mile..	\$7,822	\$6,786	\$7,255		8,436	

Note.—Operating expenses 1910, \$1,931,172,000; ratio to revenues 67.98%; expenses per mile of line, \$8,068.

Mark the high ratio of expenses to revenues, 68.91, in the face of record earnings.

The next table gives the net operating revenues for the same roads and years, by months.

SUMMARY OF NET OPERATING REVENUES OF THE RAILWAYS OF THE UNITED STATES FOR THE CALENDAR YEARS 1907 TO 1912 (OMITTING 1910), BY MONTHS AND HALF-YEARLY DIVISIONS.

	1907 (thousands)	1908 (thousands)	1909 (thousands)	1911 (thousands)	1912 (thousands)
January.....	\$ 64,775	\$ 41,108	\$ 50,491	\$ 53,744	\$ 46,414
February.....	56,800	37,311	49,241	49,868	57,736
March.....	69,275	55,309	69,658	69,210	60,530
April.....	69,310	50,787	62,409	64,769	58,188
May.....	73,060	50,594	65,717	69,935	67,026
June.....	72,475	59,338	74,043	72,794	76,506
Half Year....	\$406,195	\$294,951	\$371,562	\$380,320	\$375,400
July.....	75,679	67,267	78,456	73,672	82,797
August.....	84,465	75,319	90,517	88,583	99,759
September....	77,755	81,858	95,449	92,583	98,737
October.....	83,576	88,909	104,101	96,086	110,516
November.....	66,294	74,472	94,383	81,627	93,861
December.....	51,673	68,587	68,467	74,129	82,709
Half Year....	\$439,445	\$456,414	\$531,374	\$506,980	\$568,379
Twelve Months.	845,640	751,365	902,937	887,300	943,779
Taxes	83,156	86,872	94,664	.....	125,753
Net Operating Income.....	\$762,484	\$664,492	\$808,173	\$771,738	\$818,026
Per Mile of Line	3,359	2,869	3,441	3,161	3,299

Note.—Net operating revenues 1910, \$800,966,000; taxes, \$109,560,000; net operating income per mile of line, \$3,344.

The reader's attention need scarcely be directed to the fact that the net operating income here shown for 1912 is only ten million more than for 1909, while per mile of line operated it is actually less than 1907, 1909 or 1910.

In the next statement the operating revenues and expenses for the last four calendar years are given in more detail with the proportion each item bears to gross earnings.

STATEMENT OF OPERATING RECEIPTS AND EXPENSES OF THE RAILWAYS OF THE UNITED STATES FOR THE CALENDAR YEARS 1909, 1910 AND 1911, FROM MONTHLY REPORTS TO THE INTERSTATE COMMERCE COMMISSION, WITH RATIOS.

Item	1909	1910	1911	1912
Average Miles Operated.....	(a) 234,950	(b) 239,975	(c) 244,138	(d) 248,008
Operating Revenues from:				
Freight.....	\$1,796,256,314	\$1,966,478,759	\$1,920,685,962	\$2,111,241,402
Per Cent of Earnings.....	68.96	69.20	68.25	69.54%
Passengers.....	601,722,959	647,739,773	661,276,838	681,203,094
Per Cent of Earnings.....	23.10	22.79	23.51	22.44%
Other Transportation Revenue	182,706,090	199,181,220	203,425,002	211,231,622
Per Cent of Earnings.....	7.01	7.01	7.23	6.96%
Non-transportation Revenue.	24,080,802	28,299,559	28,834,898	32,400,300
Per Cent of Earnings.....	.93	1.00	1.01	1.06%
Total Operating Revenues..	\$2,604,766,165	\$2,841,699,311	\$2,815,222,700	\$3,036,076,418
Operating Expenses:				
Maintenance of Way and Structure	339,167,666	383,133,718	367,020,155	389,253,937
Ratio to Revenue.....	13.02	13.49	13.04	12.82
Maintenance of Equipment...	387,155,080	430,928,959	433,500,458	487,883,273
Ratio to Revenue.....	14.86	15.13	15.40	16.07
Traffic Expenses.....	53,257,408	53,643,461	59,321,315	62,352,545
Ratio to Revenue.....	2.04	2.07	2.11	2.05
Transportation	857,339,037	986,756,731	995,926,925	1,079,313,945
Ratio to Revenue.....	32.92	34.74	35.39	35.55
General Expenses.....	65,441,052	71,634,766	74,322,370	73,943,512
Ratio to Revenue.....	2.52	2.52	2.64	2.42
Unclassified.....	16,809	74,472	12,163	.....
Total Operating Expenses....	\$1,702,377,052	\$1,931,172,107	\$1,930,103,386	\$2,092,297,214
Ratio.....	65.36	67.98	68.58	68.91
Net Operating Revenue.....	902,389,112	910,527,204	884,119,314	943,779,204
Ratio to Revenue.....	34.64	32.02	31.42	31.09
Profit from Outside Operations	3,367,713	1,686,736	2,272,659	1,710,130
Net Revenues.....	\$ 905,756,825	\$ 912,203,940	\$ 886,391,973	\$ 945,489,334
Taxes.....	\$ 92,964,510	\$ 109,527,204	\$ 115,561,966	\$ 125,753,235
Ratio to Gross Earnings.....	3.56	3.85	4.10	4.14
Net Operating Income.....	812,792,315	802,676,736	770,830,007	819,736,099
Ratio to Earnings.....	31.21	28.25	27.39	27.00
Per Mile of Line.....	\$3,460	\$3,345	\$3,157	\$3,305

(a) At the close of the year 1909 the reports covered 236,166 miles of operated line.

(b) " " " " " 1910 " " " 241,364 " " " "

(c) " " " " " 1911 " " " 246,000 " " " "

(d) " " " " " 1912 " " " 249,250 " " " "

Any reader of a speculative turn of mind can figure out for himself what would have been the effect on the net operating income if a wage scale increasing the pay roll \$60,000,000 annually without adding one dollar to the efficiency of labor had been in effect during

the calendar year 1912. The final figures in this last table are not strictly comparable with those that precede it because they include "profit from outside operations," which the former do not.

This condition of a net income inadequate to meet all current obligations and provide for the pressing financial necessities of the future, despite phenomenal revenues made possible by phenomenal and unseasonable weather during the last half year, is the real "economic problem" confronting the American railways today. And it will continue to confront them until the Interstate Commerce Commission, like Saul of Tarsus on the plains of Damascus, sees a great light.

THE BUREAU'S STATISTICS FOR 1912

Concerning the statistics, compiled exclusively by this Bureau from returns identical with those furnished to the Interstate Commerce Commission, it may be premised that they cover the operations of 386 companies operating 236,444 miles, or about 95% of the mileage and 97.75% of the total traffic of the railways of the United States for the year ending June 30, 1913. Since the innovations recently introduced into the official reports (that is since 1907), they afford the only complete review of American railways, including switching and terminal companies, from an operating point of view.

They are as nearly accurate as great care can make them. The opinions and views that accompany them are the writer's own, which the reader can accept or reject at his pleasure.

For the sake of brevity, the Interstate Commerce Commission is referred to herein as the "Commission"; the Commission's "Statistics of Railways in the United States" as "Official Statistics," and "the year ending June 30th" is implied before the year named unless otherwise specified.

The statements as to foreign railways are compiled from the latest official sources available.

In addition to the acknowledgment already made for the courteous co-operation of railway officials, the writer wishes to record his personal appreciation of the assistance extended to the Bureau by members of federal and state Commissions, who, however differing as to the interpretation of railway statistics, have recognized that no effort should be spared to get the facts before the American people.

TWO DECADES OF RAILWAY PROGRESS

RAILWAY RESULTS IN THE UNITED STATES FOR THE YEARS ENDING
JUNE 30, 1892, 1902 AND 1912 WITH PERCENTAGES OF INCREASE
IN TWENTY AND TEN YEARS.

Item (m=Thousands)	1892	1902	1912	1912 Over 1892 %	1912 Over 1902 %
Population.....	65,086,000	79,230,563	95,656,000	46.9	20.8
Miles of Line (operated).....	162,397	200,154	248,888	53.3	24.3
Miles of All Track.....	211,051	274,195	370,317	75.5	35.1
Net Capitalization (m).....	\$8,294,679	\$9,925,664	\$14,657,545	76.7	47.7
Net Capitalization per Mile of Line...	52,348	50,962	61,508	17.6	20.8
Net Capitalization per Mile of Track..	40,050	36,921	41,204	3.0	11.6
Revenues from Operation (m).....	1,171,407	1,726,380	2,870,736	145.1	66.3
Revenues per Mile Operated.....	7,213	8,625	11,534	59.9	33.7
Expenses of Operation (m).....	780,997	1,116,248	1,990,198	154.8	78.3
Expenses of Operation per Mi. operated	4,809	5,577	7,996	66.3	43.4
Net Revenues from Operation (m)....	390,409	610,131	880,538	125.5	44.3
Net Revenues per Mile operated.....	2,404	3,048	3,538	47.1	16.1
Ratio of Expenses to Revenues.....	66.67%	64.66%	69.33%	4.0	7.2
Receipts from Passengers (m).....	\$286,805	\$ 392,963	\$ 668,642	133.1	70.2
Receipts from Freight (m).....	799,316	1,207,228	1,980,805	147.8	64.0
Receipts from Mail (m).....	26,861	39,835	51,620	92.2	29.6
Receipts from Express (m).....	22,148	34,253	74,735	238.0	118.4
Passengers Carried (m).....	560,958	649,878	994,382	77.3	53.0
Passengers Carried 1 Mile (m).....	13,362,898	19,689,937	33,510,673	150.8	70.2
Average Receipts per Passenger Mile (cents).....	2.126	1.986	1.992	d 6.3	.3
Average Passengers in Train.....	42	45	57	35.7	26.6
Average Journey per Passenger (miles)	23.82	30.30	33.76	41.7	11.4
Freight Tons Carried (m).....	706,555	1,200,315	1,806,173	155.6	50.4
Freight Tons Carried 1 Mile (m).....	88,241,050	157,289,370	267,313,687	202.9	69.9
Average Receipts per Ton Mile (mills)	8.98	7.57	7.41	d 17.5	d 2.1
Average Tons in Train.....	181	296	422	133.1	42.5
Average Haul per Ton (miles).....	124.89	131.04	148	19.3	12.9
Locomotives (number).....	33,136	41,225	62,291	88.0	51.1
Locomotives Weight without Tender (tons).....	1,457,984	2,308,000	4,892,101	235.7	111.9
Passenger Cars (number).....	28,876	36,987	51,306	77.7	38.7
Freight Cars (number).....	966,998	1,546,101	2,243,465	132.0	45.1
Freight Cars Capacity (tons).....	22,240,954	43,416,029	84,129,937	278.2	93.7
Employees (number).....	821,415	1,189,315	1,728,603	110.4	45.3
Employees per 100 Miles of Line.....	506	594	695	37.3	17.0
Employees Compensation.....	\$468,598,170	\$676,028,592	\$1,268,977,272	170.8	87.7
Proportion of Gross Earnings.....	40.00%	39.17%	44.20%	9.1	12.8
Proportion of Operating Expenses....	60.08%	60.56%	63.76%	6.0	6.0
Taxes.....	\$34,053,495	\$54,465,437	\$120,873,472	254.9	121.9
Per Mile of Line.....	209	272	485	132.0	78.3
Proportion of Gross Earnings.....	2.90%	3.15%	4.21%	45.2	33.6

I

MILEAGE OF STEAM RAILWAYS IN 1912

By careful computations the operated mileage of the steam railways of the United States, of which reports are required under the Act to Regulate Commerce, for the year ending June, 30, 1912, has been found to be 248,888 miles. Of these 236,444 miles, or 95%, are covered by the reports to this Bureau, against 232,117 miles for the preceding year and only 219,372 miles covered by the monthly bulletins of the Interstate Commerce Commission.

These last, it should be remembered, are confined to the reports of companies whose operating revenues for the year ending June 30, 1911, exceeded \$1,000,000. Such an arbitrary limitation leaves almost 30,000 miles, or more than the entire railway mileage of France, unaccounted for. The omission of these smaller roads and the exclusion of information for switching and terminal companies rob official statistics of the comprehensive character so necessary to anything like comparative statistics.

While the single track mileage (236,444 miles) reported to this Bureau for 1912 nearly equals the official mileage for 1910, the auxiliary trackage reported exceeds that officially reported in 1911, as the following figures show:

	1911 (Official)	1912 (Bureau)
Single track.....	246,124	236,444
Second track.....	23,452	24,944
Third track.....	2,414	2,528
Fourth track.....	1,747	1,763
Yard track and sidings.....	88,973	90,693
Total all tracks.....	362,710	356,372

It is the inclusion of such a full proportion of auxiliary tracks that enables the 386 companies reporting to the Bureau to handle 97.75% of the entire railway traffic of the United States.

Of the 236,444 miles reported to this Bureau 10,588 miles were operated under trackage rights, leaving 225,856 miles as the net physical mileage.

The first summary under this title presents the *operated* mileage reported to this Bureau in 1912 and 1911, classified by states and territories, in comparison with the official figures of mileage "owned" in 1910, with relation to area and population of the respective territorial divisions:

**SUMMARY OF RAILWAY MILEAGE IN THE UNITED STATES, BY STATES, FOR THE
YEARS ENDING JUNE 30, 1912, 1911 AND 1910, AND ITS RELATION TO AREA
AND POPULATION.**

State	Bureau's Figures		Commission's Figures		Population Per Mile of Line 1910 %
	1912 Miles Operated	1911 Miles Operated	1910 Miles Owned	Miles of Line per 100 Sq. Miles	
Alabama.....	5,054	4,994	5,226	10.19	409
Arizona.....	1,974	1,962	2,097	1.84	97
Arkansas.....	4,376	4,253	5,306	10.10	296
California.....	6,739	6,610	7,772	4.99	306
Colorado.....	5,716	5,646	5,532	5.34	144
Connecticut.....	1,000	1,000	1,000	20.75	1,115
Delaware.....	339	340	337	17.04	604
Florida.....	3,923	3,769	4,431	8.08	169
Georgia.....	6,839	6,631	7,056	12.02	369
Idaho.....	2,151	1,925	2,178	2.61	149
Illinois.....	13,024	13,257	11,878	21.20	474
Indiana.....	7,629	7,098	7,420	20.59	364
Iowa.....	9,867	9,987	9,755	17.55	228
Kansas.....	9,312	9,216	9,007	11.01	184
Kentucky.....	3,587	3,494	3,526	8.77	649
Louisiana.....	4,695	4,477	5,554	12.23	298
Maine.....	2,113	2,096	2,248	7.52	330
Maryland.....	1,325	1,326	1,426	14.35	901
Massachusetts.....	2,138	2,087	2,115	26.31	1,592
Michigan.....	8,471	8,360	9,021	15.69	311
Minnesota.....	8,952	8,893	8,669	10.72	239
Mississippi.....	3,860	3,672	4,506	9.72	399
Missouri.....	8,287	8,336	8,083	11.76	407
Montana.....	4,332	4,294	4,207	2.88	89
Nebraska.....	6,224	6,151	6,067	7.90	196
Nevada.....	1,630	1,601	2,276	2.07	35
New Hampshire.....	1,237	1,213	1,245	13.80	345
New Jersey.....	2,260	2,146	2,260	30.08	1,122
New Mexico.....	3,048	2,975	3,032	2.48	108
New York.....	8,353	8,338	8,430	17.09	1,081
North Carolina.....	4,228	4,110	4,932	10.12	447
North Dakota.....	4,430	4,379	4,201	5.99	137
Ohio.....	9,261	9,028	9,134	22.42	521
Oklahoma.....	5,907	5,898	5,980	8.62	277
Oregon.....	2,131	2,125	2,284	2.39	294
Pennsylvania.....	10,986	10,894	11,290	25.18	678
Rhode Island.....	195	196	212	19.88	2,557
South Carolina.....	3,072	2,878	3,442	11.29	440
South Dakota.....	3,994	3,984	3,947	5.14	148
Tennessee.....	3,633	3,587	3,815	9.15	572
Texas.....	13,977	13,081	14,281	5.44	272
Utah.....	1,834	1,819	1,985	2.42	188
Vermont.....	962	936	1,100	12.06	323
Virginia.....	4,421	4,436	4,534	11.26	454
Washington.....	5,140	5,133	4,875	7.29	234
West Virginia.....	3,068	2,885	3,600	14.99	339
Wisconsin.....	7,351	7,106	7,475	18.53	312
Wyoming.....	1,477	1,457	1,645	1.69	89
Dist. of Columbia.....	51	52	36	59.95	9,174
Canada†.....	1,871	1,760	.....	.....	.....
Mexico†.....	.....	226	.....	.....	.....
United States.....	236,444	232,117	240,438	8.08	382

* Census figures 1910 divided by commission's figures for 1910.

† Mileage operated in Canada and Mexico by American roads.

By means of this table the student can readily place his finger on the states where there is greater need of railway construction than railway regulation. In some states the demand is for more miles of single track, while in others, as in all, the crying need of the hour is for additional auxiliary trackage and increased terminal facilities, especially for freight traffic.

The student should not overlook the study in contrasts afforded by New Mexico sandwiched in between New Jersey and New York. There is meat in this sandwich for the citizen of New Mexico to chew upon.

The relation of railway mileage to area and population in the United States, since reliable figures have been kept, is shown in the next summary:

SUMMARY OF RAILWAY MILEAGE IN THE UNITED STATES, 1912 TO 1890, AND ITS RELATION TO AREA AND POPULATION.

Year Ending June 30	Population (Official) %	Miles of Line Owned	Miles of Line per 100 Sq. Miles of Territory	Inhabitants per Mile of Line
1912.....	95,656,000	248,000	8.34	382
1911.....	93,983,000	245,724	8.24	382
1910.....	91,972,266	240,438	8.05	382
1909.....	90,556,521	236,868	7.98	382
1908.....	88,938,527	230,494	7.76	378
1907.....	87,320,533	227,671	7.74	370
1906.....	85,702,539	222,575	7.55	373
1905.....	84,084,545	217,018	7.34	378
1904.....	82,466,551	212,577	7.20	379
1903.....	80,848,557	207,187	7.00	384
1902.....	79,230,563	201,673	6.82	388
1901.....	77,612,569	196,075	6.64	391
1900.....	75,994,575	192,941	6.51	393
1899.....	74,318,000	188,277	6.37	395
1898.....	72,947,000	185,371	6.28	394
1897.....	71,592,000	182,920	6.21	390
1896.....	70,254,000	181,154	6.15	384
1895.....	68,934,000	179,176	6.08	382
1894.....	67,632,000	176,603	6.02	379
1893.....	66,349,000	170,332	5.94	377
1892.....	65,086,000	165,691	5.78	380
1891.....	63,844,000	164,603	5.67	380
1890.....	62,947,714	159,272	5.51	384

* For other than census years prior to 1900, and since 1910, the figures of population represent the estimates of the Actuary of the Treasury; between 1900 and 1910 they are estimates of the Bureau of the Census.

This table illustrates how railway extension in the United States has kept abreast of the country's growth during the past twenty-two years. In proportion to territory we have over 50% more miles

of railway than in 1890; while the last column proves that railway building has kept pace with a population increasing at the rate of 21% per decade. But American railways have to provide for a traffic increasing at the rate of over 100% a decade.

NEW RAILWAY CONSTRUCTION IN 1912.

During the calendar year 1912, according to the *Railway and Engineering Review*, 3,703 miles of new main line and 3,162 miles of auxiliary tracks were laid in the United States. The former was distributed among the several states as follows:

SUMMARY SHOWING MILEAGE OF RAILWAYS BUILT IN THE UNITED STATES IN THE CALENDAR YEAR 1912, CLASSIFIED BY STATES.

State	Miles Built	State	Miles Built
Alabama.....	16.03	Nebraska.....	36.87
Arizona.....	119.33	Nevada.....	61.90
Arkansas.....	85.09	New Jersey.....	1.57
California.....	114.64	New York.....	28.57
Colorado.....	6.27	North Carolina.....	116.30
Florida.....	239.70	North Dakota.....	346.91
Georgia.....	170.58	Ohio.....	13.13
Idaho.....	70.70	Oklahoma.....	265.81
Illinois.....	54.72	Oregon.....	115.61
Indiana.....	5.04	Pennsylvania.....	146.78
Iowa.....	125.57	South Carolina.....	114.50
Kansas.....	77.96	South Dakota.....	8.50
Kentucky.....	124.64	Tennessee.....	45.20
Louisiana.....	93.72	Texas.....	206.07
Maine.....	5.79	Utah.....	24.33
Maryland.....	19.57	Vermont.....	1.00
Massachusetts.....	5.00	Virginia.....	13.64
Michigan.....	39.83	Washington.....	125.68
Minnesota.....	79.24	West Virginia.....	133.54
Mississippi.....	63.48	Wisconsin.....	20.50
Missouri.....	16.98	Wyoming.....	69.00
Montana.....	130.25		
Total.....			3,703.81
Auxiliary Track.....			3,162.26
Total all Tracks.....			6,866.07

The same authority states that 2,315 miles of main track were added to the railway mileage of Canada during the year 1912.

These figures may be compared with 3,695 miles of single track and 3,130 miles of auxiliary track built in the United States, and 1,906 miles of main track built in Canada in 1911.

In presenting them the *Review* says: "The evidence of lack of money from insufficient earnings and impaired credit is to be found in these figures."

RAILWAY MILEAGE IN FOREIGN COUNTRIES.

Nothing short of transporting the student to other countries, where he could visualize the difference in conditions, could be as effective as a perusal of the subjoined figures to fix in his mind the contrast between the railway facilities in the United States and abroad. The following summary has been compiled from the *Archiv fur Eisenbahnwesen* for May-June, 1912.

SUMMARY OF THE WORLD'S RAILWAYS AND RATIO OF MILEAGE TO AREA AND POPULATION IN EACH COUNTRY, TOGETHER WITH STATE-OWNED MILEAGE IN 1910.

Countries	Mileage in 1910		Miles of Line per 100 Sq. Miles	Inhabitants per Mile of Line.
	State Railways	Total Railways		
I. EUROPE				
Germany.....	34,625	37,996	17.9	1,724
Austria-Hungary (including Bosnia and Herze- govna).....	22,047	27,571	10.6	1,852
Great Britain and Ireland.....	.....	23,351	19.3	1,923
France.....	5,511	30,687	14.8	1,282
Russia in Europe (including Finland 2,246 miles).....	21,659	37,008	1.8	3,449
Italy.....	8,830	10,538	9.5	3,334
Belgium.....	2,686	5,288	46.3	1,408
Luxemburg.....	119	318	31.7	795
Netherlands.....	1,663	1,984	15.6	2,941
Switzerland.....	1,701	2,921	18.3	1,220
Spain.....	.....	9,317	4.8	2,000
Portugal.....	671	1,808	5.1	2,940
Denmark.....	1,217	2,192	14.8	1,176
Norway.....	1,557	1,921	1.6	1,220
Sweden.....	2,717	8,688	5.0	629
Servia.....	357	494	2.6	5,882
Roumania.....	1,980	2,238	4.3	3,030
Greece.....	.....	981	3.9	2,703
Bulgaria.....	987	1,106	2.9	3,846
Turkey in Europe.....	.....	968	1.4	6,250
Malta, Jersey, Isle of Man.....	.....	68	16.1	5,263
Total for Europe, 1910.....	107,727	207,447	5.5	2,180
“ “ “ 1909.....	.....	204,864	5.5	1,923
“ “ “ 1908.....	.....	201,619	5.3	1,941
“ “ “ 1907.....	.....	199,345	5.3	1,887
“ “ “ 1906.....	.....	196,437	5.2	1,993
“ “ “ 1905.....	.....	192,507	5.1	2,084
“ “ “ 1904.....	.....	189,806	5.0	2,084
“ “ “ 1903.....	.....	186,685	5.0	2,084
“ “ “ 1902.....	.....	183,989	4.9	2,127
“ “ “ 1901.....	.....	180,817	4.8	2,174
“ “ “ 1900.....	.....	176,396	4.7	2,220
“ “ “ 1899.....	.....	172,953	4.6	2,220
“ “ “ 1898.....	.....	167,614	4.4	.....
“ “ “ 1897.....	.....	163,550	4.3	.....
“ “ “ 1896.....	.....	160,030	4.2	.....
Increase in fourteen years.....	.....	47,417	.....	.....

SUMMARY OF THE WORLD'S RAILWAYS AND RATIO OF MILEAGE TO AREA AND POPULATION IN EACH COUNTRY, TOGETHER WITH STATE-OWNED MILEAGE IN 1910.—Continued.

Countries	Mileage in 1910		Miles of Line per 100 Sq. Miles	Inhabitants per Mile of Line
	State Railways	Total Railways		
II. AMERICA				
Canada.....	1,718	24,726	0.8	263
United States of America (inclusive of Alaska 420 miles).....		241,203	6.8	369
Newfoundland.....		666	1.6	359
Mexico.....		15,260	1.9	952
Central America (Guatemala, 594 miles; Hon- duras, 90 miles; Salvador, 122 miles; Nicara- gua, 200 miles; Costa Rica, 547 miles; Pan- ama, 47 miles).....		1,599		
Greater Antilles (Cuba, 2,331 miles; Dominica, 195 miles; Haiti, 139 miles; Jamaica, 135 miles; Porto Rico, 200 miles).....	42	3,031		
Lesser Antilles (Martinique, 139 miles; Bar- badoes, 108 miles; Trinity, 88 miles).....		336		
United States of Colombia.....		510	0.1	9,091
Venezuela.....		633	0.16	3,846
British Guiana.....		103	0.11	2,859
Dutch Guiana.....		37		
Ecuador.....		333	0.32	4,166
Peru.....	844	1,584	0.32	2,940
Bolivia.....		756	0.16	3,030
United States of Brazil.....	5,443	13,278	0.5	1,613
Paraguay.....		157	0.16	4,000
Uruguay.....		1,546	2.3	671
Chili.....	1,682	3,526	1.0	943
Argentine Republic.....	2,467	17,794	1.6	275
Total for America.....	12,197	327,084		
III. ASIA				
Central Russia in Asia.....	6,181	4,066	1.9	2,325
Siberia and Manchuria.....		6,739	0.14	1,032
China.....		5,420	0.13	83,300
Japan (including Corea).....	4,542	6,093	2.4	10,000
British India.....	24,460	32,092	1.6	9,091
Ceylon.....		577	2.3	7,143
Persia.....		34	0.005	280,000
Asia Minor, Syria, Arabia, including Cyprus...	912	3,130	0.5	6,250
Portuguese Indies.....		51	3.5	11,110
Malay Archipelago.....		757	2.3	9,434
Dutch Indies.....		1,551	0.6	20,000
Siam.....	637	637	0.32	14,278
Cochin China.....		2,178		
Total for Asia.....	36,733	63,329		

SUMMARY OF THE WORLD'S RAILWAYS AND RATIO OF MILEAGE TO
AREA AND POPULATION IN EACH COUNTRY, TOGETHER WITH
STATE-OWNED MILEAGE IN 1910.—Continued.

Countries	Mileage in 1910		Miles of Line per 100 Sq. Miles	Inhabitants per Mile of Line
	State Railways	Total Railways		
IV. AFRICA				
Egypt.....	2,792	3,674	1.0	3,125
Algiers and Tunis.....		3,134	1.0	2,128
Belgian Congo.....		515		
South African Union, including Cape Colony, Natal, Cent. So. African and Rhodesian Rail- ways.....	9,192	9,645		
COLONIES				
German.....	1,691	1,691		
English.....		1,807		
French.....		1,360		
Italian.....		72		
Portuguese.....		1,001		
Total for Africa.....		22,900		
V. AUSTRALIA				
New Zealand.....	2,716	2,746	2.6	371
Victoria.....	3,490	3,505	4.0	362
New South Wales.....	3,642	3,783	1.3	422
South Australia.....	1,911	2,082	0.16	208
Queensland.....	3,661	4,011	0.6	226
Tasmania.....	469	633	2.4	293
West Australia.....	2,144	2,422	0.16	193
Hawaii, etc.....		88	1.3	1,234
Total for Australia.....	18,035	19,272	0.6	311
RECAPITULATION				
I. Europe.....	107,727	207,447	5.5	2,180
II. America.....	12,197	327,084		
III. Asia.....	36,733	63,329		
IV. Africa.....	13,674	22,900		
V. Australia.....	18,035	19,272	0.6	311
Total.....	188,368	640,032		

From this table it appears that less than one-third (29%) of the railways of the world have been nationalized. In Europe, however, the proportion rises to over 50%, whereas in America it shrinks to less than 4%, and in North America it dwindles to two-thirds of 1%.

The columns showing the relative density of railway mileage to area and population in the several countries is particularly interesting. Belgium, with over 46 miles of line to every 100 square miles of territory, affords the most marked contrast to Persia, with only one two-hundredth of a mile of line to each 100 square miles of area, and only one mile of railway to over a quarter of a million inhabitants. Canada affords the best illustration of railway construction in advance of a rapidly growing population.

This table also shows that the railway mileage per capita is almost six times greater in the United States than in Europe.

MILEAGE OF ALL TRACKS.

The next statement gives the mileage of all tracks, including yard tracks and sidings, which are the indispensable adjuncts to the vast transportation service of the railways of the United States. The second track mileage in the United States is now greater than the single track mileage of the United Kingdom:

SUMMARY OF MILEAGE OF SINGLE TRACK, SECOND, THIRD AND FOURTH TRACK AND YARD TRACK AND SIDINGS IN THE UNITED STATES, 1890 TO 1912.

Year	Single Track	Second Track	Third Track	Fourth Track	Yard Track and Sidings	Total Mileage Operated (all Tracks)
1912 Bureau 95%.....	236,444	24,944	2,528	1,763	90,693	356,372
1911 Official.....	*246,124	23,452	2,414	1,747	88,973	362,710
1910 ".....	*240,831	21,659	2,206	1,489	85,581	351,767
1909 ".....	*235,402	20,949	2,169	1,453	82,376	342,351
1908 ".....	*230,494	20,209	2,081	1,409	79,452	333,646
1907 ".....	227,455	19,421	1,960	1,390	77,749	327,975
1906 ".....	222,340	17,396	1,766	1,279	73,760	317,083
1905 ".....	216,973	17,056	1,609	1,215	69,941	306,796
1904 ".....	212,243	15,824	1,467	1,046	66,492	297,073
1903 ".....	205,313	14,681	1,303	963	61,560	283,821
1902 ".....	200,154	13,720	1,204	895	58,220	274,195
1901 ".....	195,561	12,845	1,153	876	54,914	265,352
1900 ".....	192,556	12,151	1,094	829	52,153	258,784
1899 ".....	187,543	11,546	1,047	790	49,223	250,142
1898 ".....	184,648	11,293	1,009	793	47,589	245,333
1897 ".....	183,284	11,018	995	780	45,934	242,013
1896 ".....	182,428	10,685	990	764	44,912	240,129
1895 ".....	180,657	10,639	975	733	43,888	236,894
1894 ".....	178,708	10,499	953	710	42,661	233,533
1893 ".....	176,461	10,051	912	668	42,043	230,137
1892 ".....	171,563	9,367	852	626	39,941	222,351
1891 ".....	168,402	8,865	813	599	37,318	215,999
1890 ".....	163,597	8,437	760	561	35,255	208,612

*Since 1908 the official mileage is exclusive of switching and terminal companies. In 1908 these had 1,624 miles of main track and 2,085 of yard tracks and sidings; in 1909 they reported 1,623 miles of main track and 2,384 of yard tracks and sidings and in 1910 they reported 1,614 and 2,270 miles respectively.

While reports to this Bureau cover only 95% of the single track mileage operated, they are practically complete for auxiliary track and sidings, as demonstrated annually by the subsequent statistics of the Interstate Commerce Commission. If the returns for single track mileage were as complete as those for auxiliary tracks the

total trackage in the United States would be found to be over 370,000 miles.

Reference to the foregoing table shows that the aggregate of yard track and sidings in the United States in 1912 exceeded the single track mileage of the United Kingdom, the German Empire and the Republic of France combined. It is this auxiliary track that enables the railways of the United States to handle a freight traffic double that of all Europe.

DISTRIBUTION OF RAILWAY MILEAGE BY GROUPS.

The distribution of all American railway track by territorial groups, as made by the Interstate Commerce Commission in the years 1890 and 1910, is shown in the following statement:

SUMMARY OF MILEAGE, BY GROUPS, SHOWING LENGTH OF SINGLE TRACK, SECOND, THIRD AND FOURTH TRACKS, YARD TRACK AND SIDINGS, 1890 TO 1910.

Group Covered		Single Track Miles	Second Track Miles	Third Track Miles	Fourth Track Miles	Yard Tracks and Sidings Miles	Total All Tracks Miles
I. Me., N. H., Vt., Mass., R. I., and Conn.....	1910.. 1890..	8,121 7,425	1,681 1,248	193 29	132 19	4,080 2,399	14,207 11,120
II. N. Y., N. J., Penn., Del., Md. and Dist. of Col.....	1910.. 1890..	23,815 17,237	7,609 4,948	1,284 664	941 507	16,101 7,533	49,749 30,899
III. Ohio, Ind., and So. Pen. of Mich.....	1910.. 1890..	26,172 20,903	4,373 1,048	517 12	291 3	13,829 6,179	45,181 28,145
IV. Va., W. Va., N. C. and S. C.....	1910.. 1890..	13,966 8,658	1,027 26	5	3	3,983 1,115	18,984 9,799
V. Ga., Fla., Ky., Tenn., Ala., and Miss.....	1910.. 1890..	27,976 15,877	713 4	2	2	7,748 2,149	36,441 18,300
VI. Ill., Ia., Wis., Minn., and parts Mich., Mo., N. D. and S. D.....	1910.. 1890..	51,830 38,198	4,581 1,012	197 54	113 31	17,244 7,594	73,965 46,889
VII. Neb., Mont., Wyo. and parts of Colo., N. D. and S. D.....	1910.. 1890..	13,935 8,807	590 13	2	2	3,559 1,307	18,089 10,127
VIII. Kan., Ark., Okla. and parts of Mo., Colo., Tex., and N. M.....	1910.. 1890..	33,987 21,173	548 93	6 2	6 1	8,786 3,111	43,333 24,380
IX. La., Tex. (except Pan- handle) and parts of N. M.....	1910.. 1890..	18,375 7,988	96 .....	..... .....	..... .....	4,069 936	22,540 8,924
X. Wash., Ore., Cal., Ida., Nev., Utah, Ariz., and parts N. M.....	1910.. 1890..	22,653 10,135	442 45	..... .....	..... .....	6,181 1,387	29,276 11,567
United States.....	1910.. 1890..	240,831 156,404	21,659 8,437	2,206 760	1,489 561	85,581 33,711	351,766 199,875

The blank spaces under "Third" and "Fourth" track indicate territory in the United States where the density of traffic has not yet reached conditions calling for these safety valves to congestion. In Texas, where railway regulation chokes the cotton crop, and where they have the largest single track mileage in the United States, less than sixty miles of second track has been built during the last decade.

GROUP DISTRIBUTION IN 1912.

During 1912 the Bureau attempted to distribute its statistics according to the territorial division prescribed by the Commission, but with indifferent success. In the mere matter of mileage this would have been a simple process, as it is done by the reporting companies. But there is no defined relation between mileage and traffic divisible by state lines. For instance, the insignificant terminal mileage of roads running east from Chicago means as much to their traffic as the hundreds of miles across Indiana, Michigan and Ohio. And yet Illinois is in one group and Indiana, Michigan and Ohio in another.

The reports to the Bureau for 1912 divide the total trackage of the United States as follows:

	Single Track	Second Track	Third Track	Fourth Track	Yard Track and Sidings	All Tracks
Group I.....	7,709	1,581	141	132	3,767	13,331
Group II.....	26,053	8,867	1,460	1,041	19,167	56,597
Group III.....	21,703	4,338	631	424	11,997	39,092
Group IV.....	14,842	1,481	16	4	5,207	21,550
Group V.....	25,457	438			7,027	32,922
Group VI.....	57,280	4,651	227	144	19,561	81,864
Group VII.....	9,035	635	4		2,680	12,354
Group VIII.....	34,729	2,122	22	8	10,747	47,628
Group IX.....	17,570	118	8		4,323	22,019
Group X.....	22,066	713	9	10	6,217	29,015
Totals.....	236,444	24,944	2,528	1,763	90,693	356,372

By comparison with the immediately preceding table it will be found that Group II in this table has been enlarged at the expense of Group III and Group VI, at the expense of Group VII. In each case the sum of the two contiguous groups in the respective tables are practically equal. The three first groups in this table embrace the territory covered by the engineers' arbitration.

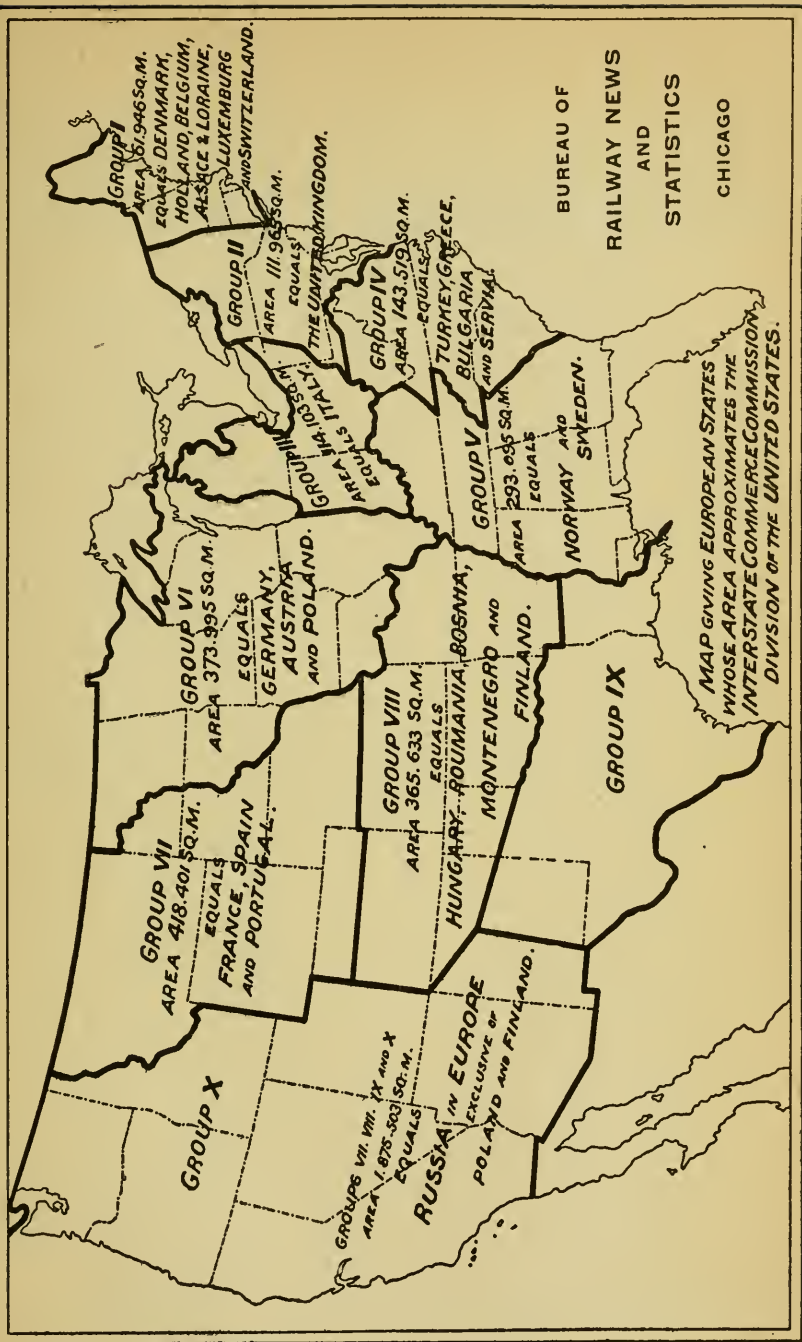
UNITED STATES GROUPS AND EUROPEAN COUNTRIES.

The accompanying map, based on that issued by the Interstate Commerce Commission, shows the Commission's groupings compared with the European states whose areas they approximate. It shows at a glance the disparity in physical conditions between this country and Europe, which the following table proves is not confined to area but extends to population—the ratio of railway mileage to population being nearly 6 to 1 more here than in Europe.

By the aid of the following table in connection with the accompanying map, the student can make many instructive comparisons:

SUMMARY SHOWING POPULATION AND RAILWAY MILEAGE OF THE
AMERICAN GROUP AND EUROPEAN COUNTRIES SHOWN ON THE
ACCOMPANYING MAP.

Division	United States 1910		Europe	
	Population	Miles of Railway	Population	Miles of Railway
I.....	6,552,681	8,121	21,756,000	13,766
II.....	21,145,629	23,815	45,450,971	23,286
III.....	9,985,342	26,172	34,565,198	10,439
IV.....	7,004,418	13,996	15,768,797	3,456
V.....	11,771,641	27,976	7,868,000	10,438
VI.....	14,445,528	51,830	105,269,000	52,863
VII.....	2,225,609	13,935	64,387,984	41,277
VIII.....	7,947,263	33,987	30,402,000	17,458
IX and X.....	10,892,056	41,028	119,193,000	35,156
Total.....	91,972,137	240,831	444,660,940	208,139



BUREAU OF
RAILWAY NEWS
AND
STATISTICS
CHICAGO

MILEAGE AND TRACK OF BRITISH RAILWAYS.

During the year ending December 31, 1911, British railways showed an increase of only 36 miles of line and 265 miles of track of all kinds, as appears in the following statement of the length of each track for 1900 and the five years since 1906, inclusive, compiled from returns to the British Board of Trade:

MILES OF TRACK OF BRITISH RAILWAYS, 1911 TO 1900.

Description of Track	1911	1910	1909	1908	1907	1906	1900
Single track (miles).....	23,425	23,389	23,280	23,209	23,112	23,063	21,855
Second track.....	13,207	13,189	13,121	13,048	12,963	12,934	12,162
Third track.....	1,520	1,517	1,500	1,435	1,385	1,363	898
Fourth track.....	1,200	1,192	1,175	1,141	1,103	1,091	729
Fifth track.....	238	236	230	208	195	186	73
Sixth track.....	142	143	138	122	117	111	36
Seventh track.....	67	70	67	59	51	47	10
Eighth to 20th tracks...	120	115	111	94	87	75	2
Sidings.....	14,660	14,460	14,350	14,353	14,145	14,032	13,069*
Total trackage.....	54,576	54,311	53,972	53,669	53,189	52,904	48,834

*Sidings for 1900 computed from returns for 1903.

Between 1900 and 1912 only 1,570 miles of line were added to the railway mileage of the United Kingdom. This was attended by an increase of \$720,842,790 in paid-up capital, or nearly \$460,000 per added mile.

II

EQUIPMENT



No better illustration of the development of the equipment of American railways to meet the physical requirements and the economic conditions of the railway situation on this continent than the above cut has been found. The specimens for 1832 and 1876 are enduring representatives of periods, while the huge 231-ton Mallet, which looms up so large by comparison with the giants of eighty and thirty-six years ago, has already been superseded by locomotives weighing over 300 tons without the tender and over 400 with it.

EQUIPMENT BUILT IN 1912.

According to the *Railway Age Gazette* (Dec. 27, 1912) car and locomotive builders reported the construction of 4,915 locomotives, 3,060 passenger cars and 152,429 freight cars during the year 1912. From the same source the following statement shows the annual additions to equipment since 1899:

SUMMARY SHOWING THE NUMBER OF CARS AND LOCOMOTIVES BUILT DURING THE YEARS 1899 TO 1912.

Year	Locomotives	Number Passenger Cars	Freight Cars
1912†.....	4,915	3,060	152,429
1911*.....	3,530	4,246	72,161
1910*.....	4,755	4,412	185,357
1909*.....	2,887	2,849	96,419
1908*.....	2,342	1,716	76,555
1907*.....	7,362	5,457	284,188
1906*.....	6,952	3,167	243,670
1905*.....	5,491	2,551	168,006
1904.....	3,441	2,144	60,806
1903.....	5,152	2,007	153,195
1902.....	4,070	1,948	162,599
1901.....	3,384	2,055	136,950
1900.....	3,153	1,636	115,631
1899.....	2,475	1,305	119,886
Total.....	59,909	38,553	2,027,852

*Includes Canadian output.

†Includes Canadian output and equipment built in railroad shops.

By reference to the figures of the equipment now in service, on succeeding pages, it will be found that the total of locomotives, passenger cars and freight cars shown above to have been built since 1899 approaches the number on hand on June 30, 1912. This indicates that in a period of thirteen years almost the entire equipment of American railways has been replaced. While this is only measurably true, because it is not always the oldest locomotives and cars that are replaced, it is evidence of a general condition.

NUMBER AND WEIGHT OF LOCOMOTIVES FOR ELEVEN YEARS, 1912 TO 1902, INCLUSIVE.

The succeeding summary gives the number, tractive power and weight of steam locomotives since the Commission has included their capacity in its reports:

SUMMARY SHOWING NUMBER AND POWER OF LOCOMOTIVES IN THE UNITED STATES DURING THE YEARS 1912 TO 1902.

Year	Number	Tractive Power (Pounds)	Weight without Tender (Tons)	Average Weight (Tons)
1912 Reported to Bureau.....	60,890	1,758,337,381	4,790,645	78.7
1911 " " "	59,909	1,686,068,353	4,581,080	76.5
1910 Official.....	*58,240	1,588,894,480	4,224,208	73.5
1909 "	*56,468	1,503,971,444	4,056,733	72.0
1908† "	56,867	1,498,793,551	4,012,553	71.0
1907 "	55,388	1,429,626,658	3,828,045	69.1
1906 "	51,672	1,277,865,673	3,459,052	66.9
1905 "	48,357	1,141,330,082	3,079,673	63.6
1904 "	46,743	1,063,651,261	2,889,492	62.1
1903 "	43,871	953,799,540	2,606,587	59.4
1902 "	41,225	839,073,779	2,323,877	56.3
Increase in nine years to 1912.....	47.7%	109.6%	106.2%	39.8%

*Excludes locomotives in service of switching and terminal companies and unclassified locomotives.

†Excludes 831 unclassified locomotives, but includes 858 locomotives of switching and terminal companies.

EQUIPMENT BEFORE 1902.

Previous to 1902 the reports of the Interstate Commerce Commission gave the equipment of the Railways of the United States, irrespective of capacity, from its organization by years as follows:

	Locomotives	Passenger Cars	Freight Cars	Company Cars
1901.....	39,584	35,969	1,464,328	50,536
1900.....	37,663	34,713	1,365,531	50,594
1899.....	36,703	33,850	1,295,510	46,556
1898.....	36,234	33,595	1,248,826	43,753
1897.....	35,986	33,626	1,221,730	42,124
1896.....	35,950	33,003	1,221,887	42,759
1895.....	35,699	33,112	1,196,119	41,330
1894.....	35,492	33,018	1,205,169	39,891
1893.....	34,788	32,911	1,201,273	39,762
1892.....	33,136	28,876	966,998	36,901
1891.....	32,139	27,949	947,300	35,185
1890.....	30,140	26,820	918,491	32,895
1889.....	29,036	24,586	829,885	31,020

By reference to the preceding table it appears that since 1889 there has been an increase of over 100% in the number of locomotives. While no figures are available showing the average weight of American locomotives in 1889, the reports for individual companies indicate that it was about 40 tons. From this it can be concluded that their aggregate weight has increased over 300% since 1889. It is believed that their tractive power has increased in approximately the same ratio—the figures since 1902 indicate a slightly greater ratio.

PASSENGER AND FREIGHT CARS.

In connection with the immediately preceding table, the next summary brings the data as to the number of passenger and freight cars down from 1889 to 1912, and shows the capacity of freight cars since 1902, when it was first reported:

SUMMARY OF PASSENGER AND FREIGHT CARS, AND CAPACITY OF
LATTER FROM 1902 TO 1912.

Year	Passenger Service	Freight Service		Average Tons	Company's Service Number
		Number	Capacity Tons		
1912 Reported to Bureau.....	50,152	2,192,987	82,189,152	37.5	113,392
1911 " " ".....	48,479	2,160,408	80,934,856	37.5	111,605
1910 Official.....	*47,059	2,135,121	76,864,356	36	108,115
1909.....	*45,584	2,071,328	73,137,546	35	99,090
1908*.....	45,117	†2,096,522	73,086,522	35	96,762
1907.....	43,973	1,991,557	67,216,144	34	91,064
1906.....	42,282	1,837,914	59,196,230	32	78,736
1905.....	40,713	1,731,409	53,372,552	31	70,749
1904.....	39,752	1,692,194	50,874,723	30	66,615
1903.....	38,140	1,653,782	48,622,125	29	61,467
1902.....	36,987	1,546,101	43,416,977	28	57,097
Ten years' increase‡.....	32.9%	41.8%	89.3%	33.9%	98.6%

*Does not include cars in service of switching and terminal companies.

†Includes 11,067 cars of switching and terminal companies and excludes 4,550 cars for which complete returns were not secured.

‡Complete returns will increase these percentages.

It is only the increase in capacity here shown and not in numbers that has enabled American railway equipment to meet the increasing demands of traffic during the past ten years. As the above table shows, the yearly additions to freight car equipment have little more than made good those destroyed and sent to the scrap heap. Estimating that the Bureau's returns cover 97.75% of the equipment, as they do of the traffic, there has been a net gain of less than 150,000 in the number of freight cars in the five years since 1908, when that number should be added every year. The railways have not bought freight cars in sufficient numbers since 1908 because their freight rates were barely sufficient to keep the old ones in repair.

COST OF EQUIPMENT.

According to the report of one of the largest locomotive manufacturing companies in the United States the average sales price of its output in 1911 was \$18,270 per engine. From this it is fair to estimate that the average cost of all American locomotives was at least \$15,000. With postal cars costing from \$8,000 to \$10,000, dining cars from \$12,000 to \$20,000, and steel passenger cars costing from \$8,000 upwards, \$6,500 is a reasonable estimate for cars in the passenger service. An order for over 12,000 freight cars has recently been given on a basis approaching \$1,300 per car, and it is many years since standard freight cars have cost less than \$1,000, so \$1,000 is a very conservative estimate of the present cost of

freight cars. Placing the average cost of company's cars at \$600, we are able to arrive at the following approximation of the cost of all equipment of American railways in 1912:

236,444 MILES REPRESENTED.

60,890 Locomotives @ \$15,000.....	\$ 913,350,000
50,152 Passenger cars @ \$6,500.....	325,988,000
2,192,987 Freight cars @ \$1,000.....	2,192,987,000
113,392 Company's cars @ \$600.....	68,035,200
Total cost of equipment.....	\$3,500,360,200

We are accustomed to think of the Panama canal as a costly investment. Here is shown an investment in railway equipment ten times greater, the mere repair and replacement of which annually costs more (\$446,446,230 in 1912), and whose adequate efficiency is ten times more essential to the happiness and comfort of the American people than twenty Panama canals, and yet the railways are not permitted to charge rates sufficient to maintain the surplus of equipment essential to meet the recurring high tides of traffic.

EQUIPMENT BY I. C. C. GROUPS.

Railway equipment, according to the last published report of the Interstate Commerce Commission, was assigned to the following territorial groups:

SUMMARY SHOWING DISTRIBUTION BY INTERSTATE COMMERCE COMMISSION GROUPS IN 1910.

Territory Covered	Locomotives	Cars Passenger Service	Cars Freight Service	Cars Company's Service
Group I.....	3,297	5,356	83,091	4,133
Group II.....	13,607	12,281	516,299	18,803
Group III.....	8,994	5,593	402,915	14,373
Group IV.....	3,102	2,097	123,831	4,887
Group V.....	4,700	3,403	170,786	8,830
Group VI.....	10,707	7,611	428,353	18,911
Group VII.....	2,480	1,688	74,166	7,536
Group VIII.....	5,971	3,874	189,138	14,471
Group IX.....	2,427	1,506	60,015	4,812
Group X.....	3,662	3,686	86,527	11,359
United States.....	58,947	47,095	2,135,121	108,115

*Exclusive of locomotives in service of switching and terminal companies.

The reports to the Committee on Relations between Railroads of the American Railway Association indicate that a substantial number of American freight cars is constantly drafted into the service of Canadian roads. The report for December, 1912, showed that the Canadian roads had an excess of 25,386 freight cars on their lines.

The total freight cars reported by all Canadian companies to the Dominion government in 1912 was 140,918 and yet the two principal companies frequently report more than 150,000 on their lines.

NUMBERS OF DIFFERENT CLASSES OF FREIGHT CARS.

The numbers of the several classes or kinds into which freight cars are divided, as reported to the Commission since 1902, are shown in the following statement:

Year	Box Cars	Flat Cars	Stock Cars	Coal Cars	Tank Cars	Refrigerator Cars	Other Cars
1910.....	966,577	153,918	77,584	878,689	7,434	30,918	78,411
Average capacity in Tons.....	33	33	30	41	39	30	37
1909.....	941,533	154,630	73,494	792,291	6,630	28,204	74,556
1908.....	950,209	159,749	76,219	805,185	6,888	27,930	70,054
1907.....	904,821	156,860	69,997	746,670	5,972	33,617	68,080
1906.....	843,118	146,908	64,202	686,717	5,324	31,782	55,584
1905.....	802,964	146,050	62,988	632,171	4,918	26,844	51,685
1904.....	780,445	147,226	64,270	622,568	4,520	22,735	46,577
1903.....	765,820	154,074	61,790	595,963	4,421	21,454	47,093
1902*.....	708,861	142,303	57,668	534,448	3,533	18,222	40,957
Average capacity in Tons.....	27	26	25	31	30	26	27

* Exclusive of 40,109 cars for which complete returns were not secured, a condition which did not recur subsequently.

GERMAN FREIGHT CAR EQUIPMENT.

Official statistics afford the following exhibit of the number and capacity of the freight car equipment of the government owned and operated railways of Germany during practically the same period covered by the last preceding table:

Year	Covered Wagons		Uncovered Wagons		Total Freight Wagons	
	Number	Capacity Average Tons	Number	Capacity Average Tons	Number	Capacity Average Tons
1910.....	171,937	13.56	394,003	13.74	565,940	13.68
1909.....	163,829	13.44	378,424	13.56	542,253	13.52
1908.....	159,102	13.38	362,644	13.36	521,746	13.36
1907.....	152,753	13.26	345,170	13.16	497,923	13.20
1906.....	141,946	13.08	325,118	12.98	467,064	13.02
1905.....	134,763	12.92	307,611	12.82	442,374	12.86
1904.....	125,498	12.62	300,580	12.72	426,078	12.68
1903.....	122,027	12.42	295,388	12.62	417,415	12.56
1902.....	122,516	12.34	291,210	12.52	413,726	12.44
1901.....	122,059	12.14	288,114	12.42	410,108	12.34

Of the total freight car equipment of German railways in 1910. only 13,197, or 2.3%, had more than two axles and only 35% had brakes of any description.

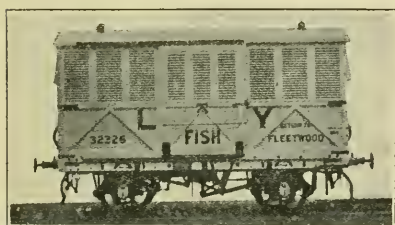
The German locomotives in 1910 numbered 27,155, of which nine have been in service since 1863. The average weight of German locomotives is 51.8 tons, including tenders.

The German passenger car equipment is decidedly mixed. It consists of 57,644 cars, of which 24,925 have only two axles, 24,980 three axles, 7,411 four axles, and only 328 six axles. The division by classes of passengers, which is even more significant, in 1910 was as follows:

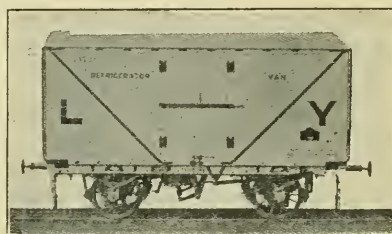
Class I.....	135
Class I and II.....	6,323
Class I, II and III.....	1,369
Class II.....	3,005
Class II and III.....	5,736
Class II, III and IV.....	38
Class III.....	24,961
Class III and IV.....	483
Class IV.....	14,931
Special.....	663
Total.....	57,644

ENGLISH FREIGHT CARS.

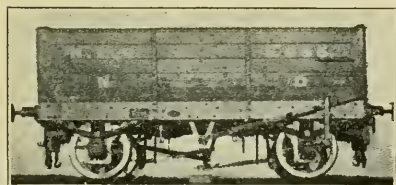
In order that the reader may form some conception of the miniature character of British rolling stock compared with that with which he is familiar on American roads, cuts of several types are here reproduced:



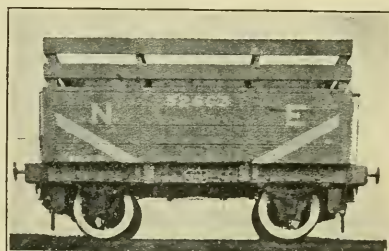
10-TON FISH VAN.



7-TON REFRIGERATOR VAN.



10½-TON COAL WAGON.



8-TON RAILED COKE WAGON.

Mark the link coupling; the absence of air brakes, except on the fish car, and the primitive braking apparatus on the other cars, worked by a side lever from the ground. These are representative cars, but some of the roads are introducing 20-ton eight-wheel bogie cars. And by way of contrast note the 12-wheel postal car in which Uncle Sam's mails are carried at less than cost.



70-FOOT STEEL POSTAL CAR.

THE SURPLUS OF FREIGHT CARS.

The varying surplus of freight cars which has existed since November, 1907, showed a decided decrease in 1912 from 1911, as appears in the next statement compiled from the reports of the Committee on Car Efficiency of the American Railway Association:

FREIGHT CAR SHORTAGES AND SURPLUS, BY MONTHS, FROM JANUARY, 1907, TO DECEMBER, 1912.

Month	1907 Shortage	1908 Surplus	1909 Surplus	1910 Surplus	1911 Surplus	1912 Surplus
January.....	110,000	342,580	333,019	52,309	110,432	102,479
February.....	150,000	322,513	301,571	51,600	156,355	44,984
March.....	.....	297,042	291,418	45,315	208,527	52,682
April.....	100,000	413,605	282,328	84,887	187,219	151,186
May.....	60,000	404,534	273,890	127,148	188,847	123,683
June.....	40,000	349,944	262,944	129,508	169,006	73,464
July.....	20,000	308,680	243,354	143,824	165,508	75,389
August*.....	15,000	253,003	159,424	105,564	108,000	58,623
September.....	60,000	133,792	78,798	54,890	70,722	27,380
October†.....	90,757	110,912	35,977	33,735	48,854	22,810
November.....	57,003	132,829	39,528	34,581	45,290	26,135
December (surplus)....	209,310	222,077	58,354	62,118	88,646	50,659

*In July and August, 1907, there was a net surplus.

†In October, 1909, the surplus in one section was offset by a shortage in another section.

During September, October, November and the early part of December, 1912, the car shortages exceeded the surpluses, but thanks to the co-operation of shippers with more stringent demurrage regula-

tions, anything like the car famine of 1907 was avoided. Reports as these pages go to press, show a surplus of 53,230 on January 15th, and 62,045 on February 1, 1913.

FREIGHT CAR PERFORMANCE.

Freight car efficiency as reported to the Committee on Relations between Railroads of the American Association for the years 1909, 1911 and 1912, is shown in the next statement, which, like that immediately preceding, includes returns for Canadian lines:

SUMMARY SHOWING THE AVERAGE PERFORMANCE OF AMERICAN AND CANADIAN FREIGHT CARS DURING THE YEARS ENDING JUNE 30, 1912, 1911 AND 1909, AND AVERAGE CAR LOAD IN 1912.

Month Year Ending June 30.	Average Miles per Day per Car			Average Ton Miles per Car per Day			Average Tons per Loaded Car 1912
	1912	1911	1909	1912	1911	1909	
July.....	21.9	22.8	20.0	317	323	275	21.1
August.....	22.9	23.2	20.8	350	358	292	21.6
September.....	23.8	24.2	22.0	368	375	320	21.6
October.....	25.0	24.8	23.8	382	376	346	21.1
November.....	24.4	24.3	23.5	376	385	341	21.9
December.....	23.4	22.7	22.3	361	349	332	22.5
January.....	20.4	22.1	20.9	325	331	293	22.8
February.....	22.9	22.6	21.7	370	330	306	22.6
March.....	24.5	23.2	22.7	389	332	330	22.4
April.....	23.3	23.3	22.4	340	317	310	21.2
May.....	23.7	23.7	22.5	350	338	304	21.7
June.....	24.1	22.9	22.4	366	338	314	21.8

The car location reports to the American Railway Association for December 14, 1912, accounted for 2,180,638 freight cars, owned by 322 railway companies in the United States. At the same time there were 2,145,580 cars on the line, of which 1,008,306 were home cars on home roads and 1,137,274 were foreign cars on home roads. The total of these two fell 35,058 short of the cars owned. Of this deficiency no less than 22,507 were across the border in Canada. At the date of this report 123,542, or 5.67% of the cars owned, were in the shops, of which nearly 75% were home cars in home shops.

SAFETY APPLIANCES.

In the matter of safety appliances, American railroads are more completely equipped than the railways of any other country. With those twin devices for the protection of trains and employes, train

brakes and automatic couplers, their equipment is practically complete—the proportions being 98% and 99.7%, respectively.

BLOCK SIGNALS.

The process of bringing railway operation in the United States under the control of the Block Signal System proceeds at the rate of about 2,000 miles a year. The following statement for 1912, compiled from the figures given by the *Railway Age Gazette*, compared with those reported to the Interstate Commerce Commission for 1911, shows the progress made during the year:

System	1912			1911	
	Single Track (Miles)	Two or More Tracks (Miles)	Total 1911 (Miles)	Total Miles of Line	Miles of Track
Automatic Block Signals.....	9,948	12,288	22,236	20,334	33,425
Non-Automatic Block Signals....	46,981	8,738	55,719	56,074	66,072
Not classified.....	.....	.....	276	.....	.....
Total.....	55,929	21,026	78,231	76,408	99,497

Although these figures show an increase of only 1,823 miles of line brought under the block system in 1912, it is fair to conclude that 3,000 miles is nearer the mark, because the government's data is more complete, especially in the matter of the manual system. It is also apparent that over 100,000 miles of track are now protected by some system of block signals.

COST OF BLOCK SIGNALLING.

Some idea of the cost involved in installing and maintaining the block signal system on the unequipped railway mileage of the United States may be had from the report of the Special Committee on Relations of Railway Operation to Legislation of the American Railway Association in November, 1910. After elaborate investigation the committee's estimates were summarized as follows:

Cost of installation of automatic block signals on railway mileage not equipped	\$286,492,976
Annual cost of maintenance.....	\$39,271,855
Annual depreciation at 7 per cent.....	20,054,508
Annual interest charge at 5 per cent.....	14,324,649

Total annual cost.....\$ 73,751,012

The committee's estimated cost of installation was \$1,232 per mile, and for maintenance, \$169 per mile of track per year.

AUTOMATIC STOPS.

Such uncertainty as to the practical benefits to be derived from the adoption of some automatic stop device exists that little progress has been made even to its tentative recommendation. Its theoretical advantages are admitted. In discussing this subject the New York Public Service Commission utters this warning:

"The use of the automatic stop will unavoidably create new dangers against which additional precautions must be devised. Its presence will have a marked tendency to cause a percentage of engineers to rely upon the stop rather than the observation of signals."

It is this deep seated uncertainty as to what might follow that causes the pause in shifting further responsibility from the man to a mechanical device.

III

EMPLOYES AND THEIR COMPENSATION*Number* 1,728,603*Pay* \$1,268,977,272

While professors, politicians and agitators are striving to resolve, regulate and legislate the financial kinks out of railway management of the United States, the true crux of the whole situation abides in the keeping of the vast army of railway employes upon whose efficiency, sobriety and eternal vigilance the successful operation of the railways depends. From president to track-walker, the line of responsibility for results runs. The president should have the mental equipment and experience for his job, and the trackman the physique and sense of duty for his. The need for more presidents is not relative to mileage, while that for track-walkers not only is, but increases as the traffic per mile grows.

As a result of misapplied regulation, the railways of the United States today are under-manned. Five years ago there were 735 employes to every 100 miles of line; today there are only 695. Where there has been an increase of only 3.4% in their numbers in those five years, there has been an increase of 15.6% in their pay. In 1912 the railways of the United States paid over \$131,000,000 more to their employes by reason of the advances in the rate of wages and not because the service rendered was more efficient, except as made so by improved management and equipment.

Between 1907 and 1912, the traffic of the railways, measured by revenues, increased less than 11%. So it appears that the compensation of employes increased out of proportion to earnings as well as to numbers. And yet no well informed authority pretends that railway labor is overpaid relatively to its service and its cost of living, over which the railways have no control.

In the face of such a situation, with the railways needing more men to operate their roads; with the present employes demanding and receiving higher wages to meet higher costs of living, and with the people demanding more and better service, the average freight rate has been forced down to the lowest point since 1901. The situa-

tion is one pregnant with possibilities of disaster to the transportation industry.

THE STATISTICS OF EMPLOYES FOR 1912.

The 386 companies reporting to this Bureau on June 30, 1912, had 1,690,709 persons in their employ, or only 11,455 less than the total reported to the Commission for the year 1911, including employes of switching and terminal companies. In the matter of compensation, however, the sum of \$1,239,425,284 paid to their employes by these 386 companies exceeds by over \$9,000,000 any annual payroll in the history of American railways.

On the assumption that the Bureau's figures cover 97.75% of the railway traffic of the country, it appears that the persons in railway employ in 1912 numbered 1,728,603, and their compensation amounted to \$1,268,977,272, which is an increase of \$38,791,253 over the total payroll of 1911. More significant is the fact that with a reduction of 3,832 from the number employed in 1910, there was an increase of over \$103,000,000 in pay.

Not only was the aggregate compensation paid American railway employes in 1912 the largest in their history, but it was the highest in proportion to the gross revenues of the railways, being 44.20%, against 43.7% in 1911.

The average daily compensation paid per man increased from \$2.42 in 1911 to \$2.44 in 1912, the latter showing an advance of 17.7% since 1905, when the Bureau began compiling the information. This 17.7% increase means that railway employes received \$216,000,000 more pay in 1912 than they would have on the rate prevailing in 1905.

The aggregate number of days worked by the employes of the 386 companies in 1912 was 508,732,152, against 497,224,726 reported by practically the same companies in 1911. The average days of employment per year per man in 1912 was 301 days, the same as in 1911. This is not a true average, because the number of employes working is not an average for the year. Railway employes have few idle days.

The first summary submitted under this title gives the number, compensation and average pay of the several classes of employes of the roads reporting to the Bureau for the year 1912, together with the aggregate reported to the Commission for the preceding years:

SUMMARY OF RAILWAY EMPLOYEES, COMPENSATION AND RATES OF
PAY PER DAY BY CLASSES IN 1912, AND AGGREGATES FROM 1889
TO 1912.

1912 (236,444 Miles Represented) Class	Number	Per 100 Miles of Line	Compensation		
			Total	Average Pay Per Day	Per Cent of Gross Revenues
General Officers.....	3,622	1.5	\$ 18,111,992	\$15.22	0.6
Other Officers.....	9,866	4.2	21,702,497	6.45	0.8
General Office Clerks.....	77,722	32.9	64,047,042	2.50	2.3
Station Agents.....	36,862	15.6	29,018,678	2.23	1.0
Other Station Men.....	161,275	68.2	97,758,363	1.90	3.5
Enginemen.....	33,260	26.8	101,449,397	5.02	3.6
Firemen.....	66,423	28.1	61,309,898	3.03	2.2
Conductors.....	48,792	20.6	67,372,682	4.29	2.4
Other Trainmen.....	135,508	57.3	127,285,178	3.02	4.5
Machinists.....	54,467	23.0	52,194,886	3.27	1.9
Carpenters.....	69,210	29.3	52,027,465	2.57	1.9
Other Shopmen.....	248,440	105.1	167,095,651	2.25	6.0
Section Foremen.....	43,113	18.2	30,835,624	2.09	1.1
Other Trackmen.....	347,433	147.0	133,320,207	1.50	4.8
Switch Tenders, Crossing Tenders and Watchmen.....	38,783	16.4	23,095,345	1.73	0.8
Telegraph Operators and Despatchers.....	42,557	18.0	34,701,160	2.46	1.2
Employees acct. Floating Equip.	11,918	5.1	8,968,119	2.32	0.3
All other Employees & Laborers	231,457	97.9	149,131,100	2.13	5.3
Total (95% Mileage Represented).....	1,690,709	715.2	1,239,425,284	2.44	44.20
1911 Official Figures.....	1,702,164	687	\$1,230,186,019	(b) \$2.42	43.7
1910.....	1,732,435	716	1,165,444,855	2.29	41.82
1909.....	1,528,808	638	1,005,349,958	2.24	41.00
1908.....	1,458,244	632	1,051,632,225	2.25	43.38
1907.....	1,672,074	735	1,072,386,427	2.20	41.42
1906.....	1,521,355	684	(a) 930,801,653	2.09	40.02
1905.....	1,382,196	637	839,944,680	2.07	40.34
1904.....	1,296,121	611	817,593,810	No data	41.36
1903.....	1,312,537	639	775,321,415	No data	40.78
1902.....	1,189,315	594	676,028,592	No data	39.28
1901.....	1,071,169	548	610,713,701	No data	38.39
1900.....	1,017,653	529	577,264,841	No data	38.82
1899.....	928,924	495	522,967,896	No data	39.81
1898.....	874,558	474	495,055,618	No data	39.70
1897.....	823,476	449	465,601,581	No data	41.50
1896.....	826,620	454	468,824,531	No data	40.77
1895.....	785,034	441	445,508,261	No data	41.44
1894.....	779,608	444	No data	No data	.....
1893.....	783,602	515	No data	No data	.....
1892.....	821,415	506	No data	No data	.....
1891.....	784,235	486	No data	No data	.....
1890.....	749,301	479	No data	No data	.....
1889.....	704,743	459	No data	No data	.....

(a) Includes \$30,000,000 estimate pay-roll of Southern Pacific, whose records were destroyed in the San Francisco disaster.

(b) Bureau computations.

UNREMUNERATIVE EXPENDITURES.

The railway payroll for 1912 continues to bear witness to the unremunerative burdens placed on the railways by federal and state regulation. This is shown in the disproportionate increase in the total pay of certain classes of employes between 1907 and 1912 in the next statement.

COMPENSATION OF CLASSES ESPECIALLY AFFECTED BY THE DEMANDS OF LEGISLATURES AND COMMISSIONS, 1912 AND 1907.

	1912 236,444 Miles Represented	1907 227,455 Miles Represented
Other Officers.....	\$21,702,497	\$15,012,226
General Office Clerks.....	64,047,042	48,340,123
Station Agents.....	29,018,678	24,831,066
Telegraph Operators and Despatchers.....	34,701,160	29,058,251
Employes account of Floating Equipment.....	8,968,119	6,035,415
Totals.....	\$158,437,496	\$123,277,081
Increase.....	\$35,160,415 or 28.6%	

In the meantime there was an increase of less than 4% in the mileage represented and only 8% in the gross revenues, out of which all railway labor is paid. The disproportionate increases in the compensation of these classes represents only a fraction of the expenditures caused by regulative exactions. But they are illustrative of a condition that heads for disaster.

AVERAGE DAILY COMPENSATION, 1912-1892.

Contrary to the view of Mr. P. H. Morrissey, the representative of the engineers on the recent arbitration board, in his dissenting opinion, the tables of the daily compensation of railway employes do reflect more or less accurately the actual earnings of the several classes to which they relate. It is true that these tables do not purport to give anything more than "averages" and that the elements entering into their compilation are so varied and dissimilar as to preclude anything like exact or scientific accuracy. But the fact remains, that with all their defects and uncertainties and to some extent because of their heterogeneous and diffusive character, they do give a fairly accurate idea of the average daily compensation of railway employes by classes and territorial divisions. Each successive report of the Commission has testified to their general accuracy while adding to their authority. In the rage for statistical innovations, nothing practical has been proposed to take their place. Their continuous uniformity counts heavily in their favor.

To the student of statistics, the effect of every change in the rate of railway wages is easily traceable throughout the following statement of daily compensation, brought down from the first publication by the Commission to the compilation of the returns to this Bureau for 1912:

COMPARATIVE SUMMARY OF AVERAGE DAILY COMPENSATION OF RAILWAY EMPLOYEES, BY CLASSES, FOR THE YEARS ENDING JUNE 30, 1912, TO 1892.

Year	General Officers	Other Officers	General Office Clerks	Station Agents	Other Stationmen	Enginemen	Firemen	Conductors	Other Trainmen	Machinists	Carpenters	Other Shopmen	Section Foremen	Other Trackmen	Switchmen, Flagmen and Watchmen	Telegraph Operators and Despatchers	Employees Account Floating Equipment	All other Employees and Laborers
1912* Bureau.....	15.22	6.45	2.50	2.23	1.90	5.02	3.03	4.29	3.02	3.27	2.57	2.25	2.09	1.50	1.73	2.46	2.32	2.13
1911* Bureau.....	15.30	6.38	2.49	2.20	1.91	4.72	2.94	4.18	2.92	3.17	2.71	2.25	2.07	1.50	1.73	2.42	2.29	2.11
1910† Official.....	13.27	6.22	2.40	2.12	1.84	4.55	2.74	3.91	2.69	3.08	2.51	2.18	1.99	1.47	1.69	2.33	2.22	2.07
1909† ".....	12.67	6.40	2.31	2.08	1.82	4.44	2.67	3.81	2.59	2.98	2.43	2.13	1.96	1.38	1.73	2.30	2.31	1.98
1908† ".....	13.11	6.27	2.33	2.09	1.82	4.45	2.64	3.81	2.60	2.95	2.40	2.12	1.95	1.45	1.78	2.30	2.38	1.97
1907 ".....	11.93	5.99	2.30	2.05	1.78	4.30	2.54	3.69	2.54	2.87	2.40	2.06	1.90	1.46	1.87	2.26	2.27	1.92
1906 ".....	11.81	5.82	2.24	1.94	1.69	4.12	2.42	3.51	2.35	2.69	2.28	1.92	1.80	1.36	1.80	2.13	2.10	1.83
1905 ".....	11.74	6.02	2.24	1.93	1.71	4.12	2.38	3.50	2.31	2.65	2.25	1.92	1.79	1.32	1.79	2.19	2.17	1.83
1904 ".....	11.61	6.07	2.22	1.93	1.69	4.10	2.35	3.50	2.27	2.61	2.26	1.91	1.78	1.33	1.77	2.15	2.17	1.82
1903 ".....	11.27	5.76	2.21	1.87	1.64	4.01	2.28	3.38	2.17	2.50	2.19	1.86	1.78	1.31	1.76	2.08	2.11	1.77
1902 ".....	11.17	5.60	2.18	1.80	1.61	3.84	2.20	3.21	2.04	2.36	2.08	1.78	1.72	1.25	1.77	2.01	2.00	1.71
1901 ".....	10.97	5.56	2.19	1.77	1.59	3.78	2.16	3.17	2.00	2.32	2.06	1.75	1.71	1.23	1.74	1.98	1.97	1.69
1900 ".....	10.45	5.22	2.19	1.75	1.60	3.75	2.14	3.17	1.96	2.30	2.04	1.73	1.68	1.22	1.80	1.96	1.92	1.71
1899 ".....	10.03	5.18	2.20	1.74	1.60	3.72	2.10	3.13	1.94	2.29	2.03	1.72	1.68	1.18	1.77	1.93	1.89	1.68
1898 ".....	9.73	5.21	2.25	1.73	1.61	3.72	2.09	3.13	1.95	2.28	2.02	1.70	1.69	1.16	1.74	1.92	1.89	1.67
1897 ".....	9.54	5.12	2.18	1.73	1.62	3.65	2.05	3.07	1.90	2.23	2.01	1.71	1.70	1.16	1.72	1.90	1.86	1.64
1896 ".....	9.19	5.96	2.21	1.73	1.62	3.65	2.06	3.05	1.90	2.26	2.03	1.69	1.70	1.17	1.74	1.93	1.94	1.65
1895 ".....	9.01	5.85	2.19	1.74	1.62	3.65	2.05	3.04	1.90	2.22	2.03	1.70	1.70	1.17	1.75	1.98	1.91	1.65
1894 ".....	9.71	5.75	2.34	1.75	1.63	3.61	2.03	3.04	1.89	2.21	2.02	1.69	1.71	1.18	1.75	1.93	1.97	1.65
1893 ".....	7.84	2.23	1.83	1.65	3.66	2.04	3.08	1.91	2.33	2.11	1.75	1.75	1.22	1.80	1.97	1.96	1.70	1.67
1892 ".....	7.62	2.20	1.81	1.68	3.68	2.07	3.07	1.89	2.20	2.08	1.71	1.76	1.22	1.78	1.93	2.07	1.67	1.67

*Pay of general officers in 1911 and 1912 out of proportion because Bureau returns do not cover hundreds of small roads.

†Averages for 1910, 1909 and 1908 do not include returns for switching and terminal companies.

Mark how the forced or voluntary compliance to the demands of employes for increased wages is reflected in the average figures for 1903, 1907 and 1910. The advance is not always emphasized in the average for one year as it is in fact because the settlements are seldom effective on June 30. For instance, the finding of the arbitration board in the engineers' case was made retroactive to May 1, 1912. Its full effect will appear in 1913.

Since the value of the averages in the foregoing table has been so publicly impugned, it may not be out of place to recall the explanation with which Prof. Henry C. Adams, statistician to the Interstate Commerce Commission for twenty-two years, accompanied their first publication. In his annual report for 1894, he said:

"A new feature is presented in the following summary, which shows the average daily compensation of railway employes by classes for the years ending June 30, 1892, 1893 and 1894. Tables of this sort are worthy of confidence only so far as the method adopted for computing them conforms to sound statistical rules, and for that reason a word of explanation may not be out of place. The number of employes returned by the carriers in their annual reports is taken from the payrolls as they stood on June 30, of the reporting year, exclusive of laborers engaged in the construction of new lines. This number, however, is not the basis for computing average compensation. The average wages for any class of employes is determined by dividing the aggregate amount of yearly compensation paid to a class by the aggregate number of days worked by the employes of the class. This gives a definite meaning to the phrase, 'average daily compensation,' and the figures may be accepted as showing accurately the accustomed rate of compensation received. One can not, however, from these figures discover the average annual income of employes, since it is not known how many days of the year individual workmen were in receipt of wages.

"Among the difficulties encountered in the compilation may be mentioned the fact that there are several methods of estimating compensation in the case of enginemen, firemen, and conductors. Some are paid by the trip, others on a mileage basis, others by the day, although certain roads which accept a day's work as the basis of payment estimate the day by a certain amount of work done rather than by the time expended. It is believed, however, that the results, so far as average compensation is concerned, are about the same whatever the computation may be.

* * * * *

"It may be an occasion of surprise that the commercial depression of the year 1894 did not cause a more marked decrease in the average compensation of employes. This is doubtless explained by the decrease in the number of men employed. The saving in the payroll was achieved by the reduction in employes rather than the reduction in wages.

* * * * *

"A comparison of the rates of compensation in the various sections is interesting. It is a safe rule for a statistician to follow to refrain from any extended generalization on the basis of a single experiment. There is no doubt but the averages in the above summaries are more trustworthy, both as to the source from which they

are drawn and the method of their compilation, than any figures of wages for railway employes yet published."

And today this compilation disclaiming anything like absolute accuracy continues to be "more trustworthy than any other figures of wages for railway employes yet published." Twenty years of inquiry and correspondence has failed to evolve any method to take its place. It has resulted in giving to the United States the most comprehensive and enlightening summaries of railway labor and wages in the world. It has been adopted by the up-to-date government of Canada.

The figures for the various groups show that the difference between the compensation to railway employes in the eastern and western sections of the country is gradually disappearing. Colored labor in the south reduces the average in that section.

RATIO OF PAY OF EMPLOYEES TO REVENUES.

The next statement gives the ratio of the aggregate compensation of railway employes to gross transportation earnings and operating expenses for the past eighteen years, or since the data was available:

SUMMARY SHOWING PROPORTION OF COMPENSATION OF EMPLOYEES TO GROSS EARNINGS AND OPERATING EXPENSES, AND OPERATING RATIO FOR SEVENTEEN YEARS, 1912 TO 1895.

Year	Ratio Compensation of Labor to Gross Earnings	Ratio Compensation of Labor to Operating Expenses	Ratio of Expenses and Taxes to Gross Earnings
1912 Bureau.....	44.20%	63.76%	73.54%
1911 Official.....	43.32%	63.10%	72.54%
1910 ".....	41.82%	62.75%	70.06%
1909 ".....	41.00%	62.06%	69.86%
1908 ".....	43.38%	62.33%	73.20%
1907 ".....	41.42%	61.41%	70.63%
1906 ".....	40.02%	60.79%	69.29%
1905 ".....	40.34%	60.40%	69.82%
1904 ".....	41.36%	61.07%	70.91%
1903 ".....	40.78%	61.65%	69.20%
1902 ".....	39.28%	60.58%	67.81%
1901 ".....	38.39%	59.27%	63.06%
1900 ".....	38.82%	60.04%	67.89%
1899 ".....	39.81%	61.04%	68.77%
1898 ".....	39.70%	60.52%	69.09%
1897 ".....	41.50%	61.87%	70.90%
1896 ".....	40.77%	60.39%	70.68%
1895 ".....	41.44%	61.38%	71.18%

These columns tell their own tale of the steady encroachment of labor and taxes on the gross revenues of American railways. No drastic retrenchments, no deferred replacements, no postponed im-

provements have sufficed to preserve the margin of operating safety and financial credit between revenues and expenses.

EUROPEAN RAILWAY LABOR.

So far as information is available, the figures giving the number and pay of European railway employes prove that they receive less than one-half and often less than one-third the annual compensation paid to American railway labor, as the following statement shows:

SUMMARY SHOWING NUMBER OF EMPLOYES, COMPENSATION AND AVERAGE YEARLY PAY OF THE PRINCIPAL EUROPEAN COUNTRIES.

Country	Miles of Railway	Employees Number	Compensation per Year	Average per Year	Ratio to Revenues
United Kingdom (1911).....	23,417	*608,750	\$164,294,320	\$270	26.6
German Empire (1910).....	36,740	700,370	271,856,775	338	37.3
Austria (1909).....	13,873	279,034	77,230,000	277	42.2
Hungary (1910).....	12,800	130,945	36,992,558	283	39.1
Russian Empire (1908).....	41,888	844,100	165,366,939	196	33.8
France (1908).....	24,915	442,790	115,125,400	260	34.4
Italy (State, 1907).....	8,762	127,372	36,462,071	287	46.4
Switzerland.....	2,740	41,973	12,279,928	292	31.9
United States of America.....	236,444	1,690,709	1,239,425,284	733	44.20

*No less than 41,690 of British railway employes are classed as boys.

Although these figures are compiled from official and semi-official sources, they are very far from affording an entirely satisfactory reflection of actual compensation to railway employes in the countries named. Outside of the German Empire, Austria, Hungary and Switzerland, the official figures are very incomplete.

PAY OF BRITISH RAILWAY EMPLOYES.

From returns made to the British Board of Trade by twenty-seven of the principal railway companies, "employing over 90 per cent of the total number of railway servants in the United Kingdom," for a normal week, the following summary has been compiled by the *Railway News* (London):

Period	Number Employed in Selected Week	Amount Paid in Wages in Selected Week	Average Weekly Earnings per Head	
First week in December		£	s. d.	\$
1902.....	449,068	559,179	24 11½	\$5.99
1903*.....	448,944	558,419	24 10½	5.97
1904.....	446,197	558,416	25 0½	6.01
1905.....	449,923	568,852	25 3½	6.07
1906.....	453,579	582,699	25 5	6.10
1907.....	479,314	618,734	25 9¾	6.20
1908.....	459,753	574,455	25 0	6.00
1909.....	459,968	583,104	25 4¼	6.09
1910.....	463,520	596,609	25 9	6.13
1911.....	472,843	630,968	26 8¼	6.41

*The second week in December, 1903.

From this it appears that the pay of British railway employes of the classes included in the table averages about \$333 per year, showing an increase of only 7% in nine years. Most of this advance was obtained in 1911 on the pledge of the government that such increase would be followed by legislation making it "a valid justification for a reasonable general increase of charges within the legal maxima, if challenged under the Act of 1894." This pledge has not been redeemed yet, proving that Earl Gray might look nearer at home than our Panama Canal diplomacy for proof of governmental proneness to shirk obligations.

The same returns to the Board of Trade show that the average pay of railway employes in England and Wales (\$6.57 per week) was considerably higher than in Scotland (\$5.63) or Ireland (\$4.98). In this connection, it is worthy of note that the Railway Workers' Union of Great Britain has set "an eight-hour day and a minimum wage of 30 s. (\$7.20) a week" as the goal for its next kick-off.

The pay of different classes of British railway employes, as found by the British Board of Trade investigations in 1909, published in 1911 was as follows:

Occupation	Average Rates of Wages		Average Actual Earnings
	Without Bonus	With Bonus	
Engine Drivers.....	\$9.72	\$9.76	\$11.16
Goods Guards and Brakemen.....	6.87	6.91	7.57
Passenger Guards.....	6.75	6.77	7.11
Signalmen.....	6.01	6.18	6.69
Firemen.....	5.79	5.81	6.67
Shunters.....	5.79	5.79	6.23
Porters (Goods).....	4.87	5.05	5.32
Laborers (Permanent Way).....	4.87	No bonus	5.28
Platelayers and Packers.....	4.77	4.77	5.15
Porters (Coaching and Traffic).....	4.55	4.55	4.82

"Other additions to the nominal rates of wages, not included in the rates of wages or earnings stated, took the form of allowances of uniform or partial clothing or of a house rent-free or at a reduced rental. The allowance of uniform or partial clothing was valued at an average of 14 cents per week per recipient or 8 cents per head of the whole number of men. The principal grades receiving the allowance of uniform were passenger and goods guards, signalmen, shunters, coaching and traffic porters and foremen. The housing allowance averaged 44 cents weekly per recipient, or 2 cents per head of all the men."

The table next preceding this shows that the present average wage of British railway employees was only 3% higher in 1911 than in 1907.

NUMBER AND PAY OF GERMAN RAILWAY EMPLOYEES.

The number and pay of the employees of the railways of the German Empire, including state and private roads, distributed among the four main classes into which they are divided, for the year ending December 31, 1910, were as follows:

SUMMARY SHOWING NUMBER AND PAY OF GERMAN RAILWAY EMPLOYEES FOR THE YEAR ENDING DECEMBER 31, 1910.

Division	Employees Number	Compensation (Total)	Average per Year	Increase over 1907
General Administration.....	32,432	\$ 26,526,648	\$818	\$65
Maintenance and Guarding Road.....	175,005	43,597,368	249	13
Station Service and Train Crews.....	303,774	122,598,624	404	44
Switching Crews and Shops.....	189,160	79,114,134	418	34
Total.....	700,371	\$271,836,774	\$ 388	\$ 35

EMPLOYEES OF AUSTRIAN RAILWAYS.

Between 1908 and 1909 the staff of Austrian railways increased only 4,047 in number, with an addition of \$5,874,600 to the payroll. The figures for 1909 were as follows:

	Number	Compensation	Average Pay
Appointed staff.....	130,832	\$53,236,506	\$407
Laborers for daily pay.....	148,202	23,993,577	164
Total.....	279,034	\$77,230,083	\$277

The report for 1908, which gives the compensation by classes more in detail, provides the following instructive summary:

	Number Employees	Total Compensation	Average per Year
Appointed staff (1908):			
1. Officers.....	21,411	\$15,711,565	\$734
2. Under officers.....	20,639	10,100,573	489
Women officers.....	2,552	491,997	193
3. Regular employees.....	76,654	21,339,401	278
Laborers for daily pay.....	153,731	23,712,059	154
Total.....	274,987	\$71,355,596	\$260

In Austria the scheme of compensation is complicated by a system of allowances, which are graded according to seniority and location of service. The railway staff, as given above, is classified on educational lines, being subdivided as numbered: Number 1 are those officials who have served as active officers in the army or navy, have graduated at a university or passed the necessary civil service examination; Number 2 are those who have been educated at recognized public or grammar schools; and Number 3 (Diener) are those officials who have been educated at elementary schools.

NUMBER AND PAY OF HUNGARIAN RAILWAY EMPLOYEES.

In Hungary railway employees are distributed into divisions and classes as follows:

Branch of Service	Officials	Other Officers		Workmen	Total
		Male	Female		
General Administration.....	1,005	719	131	139	1,994
Track Inspection and Maintenance.....	1,120	11,871	5	32,695	45,691
Traffic Service.....	5,448	35,244	580	9,632	50,904
Train Despatching and Workshops.....	1,010	11,690	13	17,625	30,338
Materials and "Inventariendienst".....	209	489	3	1,227	2,018
Total.....	8,882	60,013	732	61,318	130,945

There is no corresponding division of the compensation paid to these classes of Hungarian railway employees, which, however, is divided among the branches of the service as follows:

Branch of Service	On the State Roads and Roads Worked by the State	On Private Roads Privately Worked	All Railways	Yearly Average
General Administration.....	\$ 860,480	\$ 301,286	\$ 1,161,766	\$583
Track Inspection and Maintenance.....	6,254,940	1,258,796	2,513,736	164
Traffic and Transportation.....	14,081,920	2,515,690	16,597,610	326
Train Despatching and Workshops.....	9,400,160	1,731,496	11,131,656	267
Materials and "Inventariendienst".....	578,440	9,340	587,780	291
Total.....	\$31,175,940	\$5,816,608	\$36,992,548	\$283

RUSSIAN RAILWAY EMPLOYEES, 1907.

Russian statistics since 1907 have failed to afford data more recent than those for that year summarized in the following table:

Year 1907	Number	Compensation	Average per Year
Russia in Europe:			
Officials and regular staff.....	302,287	\$66,341,090	\$219
Day laborers.....	214,143	34,407,150	161
Russia in Asia:			
Officials and regular staff.....	57,762	20,438,805	353
Day laborers.....	45,753	9,040,310	199
Private companies:			
Officials and regular staff.....	129,527	27,624,085	212
Day laborers.....	86,563	11,991,260	139
Total.....	836,035	\$169,842,700	\$203

The average compensation of officers and staff employes throughout the empire was \$223 per annum and of day laborers, \$159.

PAY OF SWISS RAILWAY EMPLOYEES.

Recent reports of Swiss railways fail to bring the number and compensation of their employes down later than 1907, as shown in the following statement:

Division	Employes Number	Compensation (Total)	Average per Year
General Administration.....	1,631	\$ 780,715	\$478
Maintenance and Inspection of Way.....	10,308	1,459,977	142
Transportation and Train Service.....	17,815	6,829,426	383
Porters and Laborers.....	12,219	3,209,810	262
Total.....	41,973	\$12,279,928	\$292

Wages of Swiss railway employes have been advanced since 1907, but in 1910 their number had been reduced to 41,179, the chief cut being in the division of maintenance and inspection.

FRENCH AND ITALIAN RAILWAY EMPLOYEES.

Reports of the working of French and Italian railways throw little light on the average compensation of their employes. Investigation by the British Board of Trade in 1908 found the minimum pay of some classes of Italian employes as low as 40 cents a day. The pay on the state railways of France runs all the way from

\$173.70 (for rail-layers and gate-keepers) to a maximum of \$3,667.00 for heads of departments.

The last definite information as to the average pay of Italian employes was in 1907, when they numbered 127,372 and received an average of \$287 per year. By 1911 their number had increased to 142,921, but nothing is reported of their compensation.

French railway statistics ignore the compensation of employes except in the department of "traction et material," where, in 1908, the average pay was \$187.50 per year.

In nearly all European countries it is impossible to judge of the income of railway employes from tables of minimum and maximum rates of pay, which are complicated with all sorts of premiums, allowances, etc. But where the total compensation and number of employes is given, the average affords some definite basis from which to draw general conclusions as to what the pay really is. In railway studies, we know that where the average is, say \$300 a year, the numerical majority are receiving less than \$300—that is, less than \$1 a day.

BELGIAN RAILWAY EMPLOYES.

Official reports of Belgian railways confine their figures to giving the number of employes in the several divisions, as follows:

	State Roads 2,684 Miles	Private Roads 243 Miles
Officials and Overseers.....	10,414	1,146
Under Officials and Assistants.....	3,154	3,572
Workmen.....	55,600	
Total.....	69,168	4,718
Per Mile of Line.....	25.76	19.43

The total compensation of Belgian railway employes is not given separately, but, including all allowances, their average annual income does not exceed \$300. The minimum pay for some classes is below 50 cents a day.

RAILWAY EMPLOYES IN JAPAN.

So far as cheap labor is concerned, Japan offers the Mecca of railway operation. The vice-president and engineer-in-chief draw 416 yen (\$208) each monthly, from which the pay declines rapidly down to \$7.34 and \$2.36 per month for male and female laborers, respectively.

The pay for the several classes, as given in the official report for the year ending March 31, 1911, was as follows:

	Number	Monthly Salary	Average per Capita
Higher Grade:			
Chokunin Rank.....	18	\$ 2,971	\$165.00
Sonin Rank.....	453	30,367	67.00
Lower Grade:			
Clerks.....	{ *6	60	11.00
	{ 4,344	92,566	21.00
Asst. Engineers.....	1,972	52,113	26.00
Employees.....	{ *510	2,291	4.47
	{ 23,709	232,512	9.80
Laborers.....	{ *2,122	5,011	2.36
	{ 65,131	476,003	7.34
Total.....	{ * \$2,638	\$ 7,371	\$2.79
	{ 95,627	888,532	8.29
*Female employes.			

To these should be added 14,143 mechanics, who work in the shops. Their aggregate pay in 1911 was \$1,480,517, or about 33 cents a day. The aggregate payroll of Japanese railways amount to less than 27.4% of their operating revenues.

RAILWAY PAY IN THE BALKANS.

It is difficult to get satisfactory information respecting the number and pay of railway employes in the Balkan states, but the figures for Roumania in 1910-11 may be regarded as typical of that section of Europe. During that year there were 28,301 employes on the 2,154 miles of railway in Roumania. Their total compensation amounted to \$7,019,410, or an average of \$248 a year per employe.

THE COST OF LIVING.

As all railway officials and employes know, the living problem of the railway industry today is the cost of living. At every conference the employe thrusts it to the front in his demands for more pay with which to meet the rising demands of his butcher, grocer, clothier and landlord. No one recks the world-old axiom that the cost of living grows by what it feeds on, literally and figuratively. In this, the railway employe does not differ one whit from his fellow American citizen. Instead of meeting the rising tide of prices by practicing the economies the learned dietarian tells him would be as well for his body as his purse, he lays the diminishing purchasing power of his wages on the doorstep of the railway manager and bids him rectify the relation between his income and his family expenditures.

For the past twenty years the railway manager has been accepting this burden, protesting its injustice and making good his losses by economies of operation and management, for which he has received small thanks. The purchasing power of his dollar has had to stand every loss imposed by the high cost of living on the eight and a half million persons dependent on the railway mail pay.

WHAT THE BUREAU OF LABOR REPORTS.

That there is nothing fictitious about the plight in which railway employes find themselves is impressively set forth in a series of Bulletins recently issued by the Bureau of Labor. The most comprehensive summary of these shows that the retail prices of fifteen articles, constituting two-thirds of the expenditure for food by the average workingman's family—and by the same token, of all families—have advanced from 6%, in the case of sugar, to over 105%, in the case of pork chops in August, 1912, over the average price, 1890 to 1899. The advances shown in this summary were as follows:

PER CENT OF INCREASE IN THE RETAIL PRICES OF THE PRINCIPAL ARTICLES OF FOOD: PRICE ON OCTOBER 15, 1912, COMPARED WITH THE AVERAGE PRICE FOR THE 10-YEAR PERIOD, 1890 TO 1899, BY ARTICLES.

Article	Per Cent of Increase in Price	Article	Per Cent of Increase in Price
Sugar, Granulated.....	5.2	Corn Meal.....	65.2
Potatoes, Irish.....	9.9	Lard, Pure.....	67.0
Flour, Wheat.....	30.3	Ham, Smoked.....	68.8
Milk, Fresh.....	38.2	Round Steak.....	82.2
Butter, Creamery.....	47.9	Eggs, Strictly Fresh.....	86.0
Sirloin Steak.....	59.9	Bacon, Smoked.....	115.6
Hens.....	60.1	Pork Chops.....	118.6
Rib Roast.....	60.6		

The date of the comparison, October 15, 1912, explains the presence of the two great stand-by's, butter and Irish potatoes, in the more moderate half of these percentages of increased prices. In the Bulletin issued in August, 1912, bringing the data down to December, 1911, these two items were in the higher division, showing the following increases over the 1890-1899 unit: Irish potatoes, 59%, and butter, creamery, 59.5%.

RELATIVE RETAIL PRICES FOR 22 YEARS.

The relative retail prices in the United States, considered as a whole, of each of the 15 principal articles of food for the 22 years

and 8 months, 1890 to October, 1912, are presented in the following statement:

RELATIVE RETAIL PRICES OF THE PRINCIPAL ARTICLES OF FOOD
IN THE UNITED STATES, 1890 TO AUGUST, 1912, BY ARTICLES.

[Average price for 1890-1899=100.0. The relative prices shown in this report for 1890 to 1907 do not exactly agree with those shown in Bulletin 77 for the reason that a smaller number of cities are included.]

Year or Month	Sirloin Steak	Round Steak	Rib Roast	Pork Chops	Bacon, Smoked	Ham, Smoked	Lard, Pure
1890.....	99.3	97.6	98.7	96.5	96.5	98.3	98.5
1891.....	99.7	98.0	99.6	98.8	97.2	99.5	100.0
1892.....	99.6	98.0	99.6	101.1	99.9	101.5	104.4
1893.....	99.4	98.5	98.4	105.0	108.9	107.1	119.2
1894.....	98.1	97.4	97.9	100.9	102.5	101.7	106.4
1895.....	98.7	98.2	97.9	99.7	98.7	98.9	99.8
1896.....	98.8	100.5	99.4	97.8	96.3	96.5	92.1
1897.....	99.6	101.8	100.1	97.5	97.0	98.5	89.0
1898.....	102.1	102.8	102.2	99.7	100.2	97.2	93.5
1899.....	104.4	107.0	106.1	103.2	102.9	100.5	97.1
1900.....	107.1	109.8	109.3	108.9	110.3	106.9	104.9
1901.....	109.4	114.0	112.7	119.0	121.3	111.1	119.6
1902.....	114.6	122.3	118.6	127.8	135.9	120.6	135.6
1903.....	110.6	116.8	117.0	126.1	140.4	122.1	126.0
1904.....	111.0	120.8	117.0	123.1	138.5	119.4	116.3
1905.....	110.6	120.0	116.2	125.0	139.3	119.4	115.8
1906.....	114.2	124.4	120.5	135.9	150.5	127.8	127.3
1907.....	116.7	128.4	123.0	140.9	157.7	131.0	135.5
1908.....	119.9	135.5	126.7	144.6	163.2	133.8	134.3
1909.....	126.1	140.6	132.2	158.7	176.4	142.1	150.5
1910.....	134.0	149.9	137.7	178.3	204.4	159.4	172.9
1911.....	134.9	152.6	138.6	170.3	197.2	155.9	145.7
1911							
January.....	134.0	150.9	137.8	170.5	203.5	155.4	161.1
February.....	133.7	151.1	138.0	168.4	201.1	154.8	158.6
March.....	134.3	152.5	138.7	167.6	198.6	153.8	151.4
April.....	134.3	153.0	139.8	167.4	196.5	153.4	146.2
May.....	135.8	154.2	140.0	166.8	196.9	154.3	140.9
June.....	136.2	155.1	139.4	167.3	196.8	157.0	139.5
July.....	136.8	154.6	138.4	171.0	199.3	160.5	138.6
August.....	137.3	154.7	138.9	180.7	200.1	162.3	139.8
September.....	135.8	153.2	138.8	183.4	199.4	159.8	142.6
October.....	133.9	151.7	137.9	179.1	193.2	157.4	142.5
November.....	133.0	149.8	137.2	160.8	190.7	153.1	142.6
December.....	132.8	149.6	137.4	155.4	187.8	150.9	141.3
1912							
January.....	137.1	154.1	140.7	164.0	186.1	151.1	141.2
February.....	137.7	155.3	141.7	157.6	183.5	150.5	141.1
March.....	140.1	153.1	143.6	166.3	183.3	150.9	141.2
April.....	146.9	167.3	150.4	185.6	190.2	155.3	145.6
May.....	157.3	179.9	166.5	188.2	195.5	159.7	152.6
June.....	159.5	184.0	163.8	186.0	196.7	161.3	155.3
July.....	160.4	184.2	162.2	188.5	197.6	162.1	155.3
August.....	162.7	186.9	163.6	205.4	200.3	163.4	157.1
September.....	162.0	184.5	161.7	217.4	208.8	166.3	161.5
October.....	159.9	182.2	160.6	218.6	215.6	168.8	167.0

RELATIVE RETAIL PRICES OF THE PRINCIPAL ARTICLES OF FOOD
IN THE UNITED STATES, 1890 TO AUGUST, 1912, BY ARTICLES.

Hens	Flour, Wheat	Corn Meal	Eggs, Strictly Fresh	Butter, Creamery	Potatoes, Irish	Sugar, Granu- lated	Milk, Fresh	Year or Month
102.8	110.2	101.3	100.3	99.2	109.0	120.8	100.4	1890
104.8	112.4	111.5	105.6	105.7	117.1	103.1	100.5	1891
104.2	104.0	107.7	105.3	106.8	95.4	96.9	100.5	1892
104.3	95.1	104.0	105.5	108.6	111.8	102.6	100.5	1893
98.2	88.3	104.4	97.4	102.0	101.8	95.2	100.3	1894
97.3	89.6	101.0	98.8	97.4	90.6	91.8	99.4	1895
96.1	94.2	92.8	90.3	93.1	78.8	96.2	100.1	1896
92.3	104.7	91.2	94.0	93.7	92.5	94.3	100.0	1897
96.8	106.9	92.9	97.9	95.8	103.9	99.7	99.8	1898
103.4	94.8	92.9	101.6	97.6	98.8	99.6	98.8	1899
99.6	94.6	95.6	99.1	101.2	92.8	103.9	100.0	1900
105.0	94.9	107.6	107.7	103.0	114.0	102.1	101.4	1901
113.6	95.6	123.9	119.4	109.8	116.7	92.8	104.1	1902
119.3	102.1	122.1	125.1	110.2	114.7	93.7	107.4	1903
120.6	118.3	122.9	131.1	108.1	119.0	100.4	107.4	1904
123.6	118.6	123.5	131.3	111.4	109.3	101.8	108.1	1905
128.0	108.3	124.5	134.2	118.3	114.6	97.2	110.0	1906
131.3	118.2	133.5	138.2	127.3	122.2	98.7	118.9	1907
134.9	127.1	142.6	142.8	127.9	129.8	101.3	123.2 ₃	1908
145.7	138.1	145.7	154.7	134.3	133.4	100.0	126.2	1909
155.0	135.9	147.9	158.2	139.9	119.5	102.5	131.6	1910
151.6	127.9	147.2	150.2	131.3	157.0	111.1	132.7	1911
154.7	130.3	144.6	185.1	140.7	119.2	99.9	135.1	January
155.5	129.2	144.6	145.9	133.1	119.0	98.9	135.2	February
156.9	127.5	143.7	123.6	128.1	121.2	99.5	134.2	March
158.7	126.2	144.5	112.9	117.8	126.5	99.9	132.3	April
156.1	125.9	145.1	110.4	114.8	142.5	100.9	129.6	May
152.3	125.8	145.2	112.8	115.6	196.9	102.4	129.8	June
151.9	125.8	146.9	122.1	119.4	240.1	105.3	129.9	July
150.1	126.7	148.7	133.0	126.2	197.6	115.0	130.5	August
149.4	127.6	149.5	146.7	131.0	167.8	130.2	131.5	September
147.3	129.5	151.2	163.4	138.9	144.1	132.2	133.8	October
143.2	130.2	152.3	196.2	149.7	149.0	124.9	134.9	November
142.9	129.5	151.9	207.3	159.5	159.0	118.2	135.0	December
151.4	130.1	152.9	202.9	166.9	177.8	115.1	134.8	1912 January
153.4	130.7	153.3	185.1	156.0	185.4	114.5	135.0	February
159.9	131.0	153.7	130.3	145.5	202.1	115.6	134.6	March
163.6	132.7	157.6	125.9	148.4	224.7	111.4	134.0	April
162.2	138.4	163.0	123.8	143.4	211.6	109.1	133.2	May
158.1	139.3	163.7	126.1	133.3	211.9	108.5	132.9	June
157.8	138.4	163.7	135.5	132.9	164.3	106.6	133.2	July
159.3	135.4	164.4	147.8	134.0	146.0	106.1	135.2	August
161.6	132.3	164.3	167.1	141.2	121.5	106.5	135.6	September
160.1	130.3	165.2	186.0	147.9	109.9	105.2	138.2	October

In submitting these tables, the commissioner of labor, Chas. P. Neill, explains that the base period selected for the compilation, 1890 to 1899, is the same as was used in former reports and is used because an average price for a number of years more nearly represents normal conditions than does the price for a single year, because of unusual conditions which may prevail in any one year.

Reference to earlier Bulletins of the Bureau show that several very important items formerly given have been omitted in the above tables. Among these, it is only necessary to mention beans, salt pork, salt beef, cheese, tea, coffee and rice. Happily for the economically inclined, none of these articles, except cheese, show as great advances as the majority of items in Commissioner Neil's recent tables of retail prices. Moreover, it is of the greatest human and industrial importance to know that the relative wholesale price of the following commodities has actually decreased:

RELATIVE PRICES, 1911, COMPARED WITH AVERAGE FOR 1890 TO 1899.

Article	Relative Price, December, 1911
Fruit: Raisins, California, London Layer.....	95.0
Bread: Crackers, Soda.....	90.5
Meat: Mutton, Dressed.....	90.3
Rice: Domestic, Choice, Head.....	88.1
Tea: Formosa, Fine.....	86.3
Soda: Bicarbonate.....	47.8

While these prices are wholesale, they are significant, and should have some effect in moderating the high cost of living to the shorn lamb, *i. e.*, the railways and the general consumer, who have no recourse by which to pass it along to their neighbors, as the shippers and merchants have.

WHOLESALE PRICES, 1890 TO 1911.

In order to get a broader view of the advance in everything that affects business, as well as the domestic life of the American people, it is necessary to follow the course of wholesale prices as presented in the following table compiled from Bulletin No. 99 of the Bureau of Labor, issued in March, 1912:

RELATIVE PRICES OF COMMODITIES BY YEARS, 1890 TO 1911, AND BY
MONTHS IN 1911 BY GROUPS OF COMMODITIES.

Year or Month	Relative Price in 1890 to 1899—100							
	Farm Products	Food, etc.	Cloths and Clothing	Fuel and Lighting	Metals and Im- plements	Lumber and Building Material	House Furnish- ing Goods	Miscel- laneous
1890.....	110.0	112.4	113.5	104.7	119.2	111.0	111.1	110.3
1891.....	121.5	115.7	111.3	102.7	111.7	108.4	110.2	109.4
1892.....	111.7	103.6	109.0	101.1	106.0	102.8	106.5	106.2
1893.....	107.9	110.2	107.2	100.0	100.7	101.9	104.9	105.9
1894.....	95.9	99.8	96.1	92.4	90.7	96.3	100.1	99.8
1895.....	93.3	94.6	92.7	98.1	92.0	94.1	96.5	94.5
1896.....	78.3	83.8	91.3	104.3	93.7	93.4	94.0	91.4
1897.....	85.2	87.7	91.1	96.4	86.6	90.4	89.8	92.1
1898.....	96.1	94.4	93.4	95.4	86.4	95.8	92.0	92.4
1899.....	100.0	98.3	96.7	105.0	114.7	105.8	95.1	97.7
1900.....	109.5	104.2	106.8	120.9	120.5	115.7	106.1	109.8
1901.....	116.9	105.9	101.0	119.5	111.9	116.7	110.9	107.4
1902.....	130.5	111.3	102.0	134.3	117.2	118.8	112.2	114.1
1903.....	118.8	107.1	106.6	149.3	117.6	121.4	113.0	113.6
1904.....	126.2	107.2	109.8	132.6	109.6	122.7	111.7	111.7
1905.....	124.2	108.7	112.0	128.8	122.5	127.7	109.1	112.8
1906.....	123.6	112.6	120.0	131.9	135.2	140.1	111.0	121.1
1907.....	137.1	117.8	126.7	135.0	143.4	146.9	118.5	127.1
1908.....	133.1	120.6	116.9	130.8	125.4	133.1	114.0	119.9
1909.....	153.1	124.7	119.6	129.3	124.8	138.4	111.7	125.9
1910.....	164.6	128.7	123.7	125.4	128.5	153.2	111.6	133.1
1911.....	162.0	131.3	119.6	122.4	119.4	151.9	111.1	131.2
1911								
January.....	155.0	127.9	121.9	123.9	119.4	155.0	110.9	131.1
February.....	152.7	127.6	121.8	124.1	120.0	156.9	110.9	131.0
March.....	156.2	126.5	121.9	124.4	120.6	157.6	110.9	133.5
April.....	156.1	126.5	121.0	121.0	120.7	159.4	111.2	132.5
May.....	157.5	125.2	120.6	120.9	120.0	154.6	111.2	131.4
June.....	158.2	128.8	120.2	120.8	119.2	150.3	111.2	133.0
July.....	163.4	129.9	120.1	121.1	119.1	149.9	111.2	129.8
August.....	163.1	134.3	119.1	121.9	119.6	147.2	111.2	129.1
September....	168.2	134.5	118.8	122.2	119.3 ^a	143.3	111.2	129.8
October.....	172.0	135.5	117.3	123.0	118.5	146.7	111.2	132.9
November....	170.0	135.9	116.6	122.4	117.7 ^a	146.4	111.2	130.8
December....	169.6	136.8	116.1	122.9	118.6 ^a	144.3	111.2	129.6

In almost every one of these commodities the advance is modified by the inclusion of one or more staples in the computation in which the advance has been slight. For instance, the food item includes fruit, bread, coffee, flour, rice, tea and sugar, in none of which has there been a marked advance, while several show an actual decline; underclothes and clothing, calicos, hosiery, sheetings, shirtings and raw silk show decreased prices; under fuel and lighting, candles and coke pull the average down from the high mark of 269.6 (1903),

made by bituminous coal at the mine, where it counts most against the railways; under lumber and building material, the soaring prices for nearly all descriptions of lumber (white pine marking 207.2 in December, 1911; yellow pine, 170.6; and spruce, 177.7) were partially offset by the falling prices of Portland cement (73.2 in 1911) and plate and window glass.

THE RAILWAYS AND THE COST OF LIVING.

Nothing in the world-wide upward movement of prices compares for utter helpless injustice with its relation to the railways of the United States. They alone of the great industries of the world are expected to absorb the high cost of living without passing it along. In the face of the fact that as purchasers of millions of dollars' worth of material and supplies included in the tables just given, mark what happened in the field of their rates (what they receive) and wages (what they expend):

RELATIVE DAILY WAGES OF OTHER TRAINMEN, OTHER SHOPMEN, OTHER TRACKMEN AND ALL OTHER EMPLOYES AND LABORERS, 1892 TO 1912, COMPARED WITH AVERAGE FOR THE EIGHT-YEAR PERIOD, 1892 TO 1899, WITH SIMILAR COMPARISON FOR AVERAGE FREIGHT AND PASSENGER RATES.

Year	Relative Rates of Daily Pay				Relative Receipts per Mile	
	Other Trainmen	Other Shopmen	Other Trackmen	Other Employees and Laborers	Per Ton of Freight	Per Passenger
1892.....	98.9	101.0	103.2	100.4	109.5	104.6
1893.....	100.0	102.3	103.2	102.2	107.1	103.3
1894.....	98.9	98.8	99.9	99.2	104.9	97.7
1895.....	99.5	99.4	99.0	99.2	102.3	100.4
1896.....	99.5	98.8	99.0	99.2	98.3	99.4
1897.....	99.5	100.0	98.1	93.5	97.3	99.6
1898.....	102.1	99.4	98.1	100.4	91.8	97.1
1899.....	101.5	100.6	99.9	101.6	88.3	97.4
1900.....	102.6	101.2	103.2	102.7	88.9	98.3
1901.....	104.7	102.3	104.1	101.6	91.4	99.1
1902.....	106.8	103.5	105.8	102.7	92.3	97.7
1903.....	113.6	108.8	110.3	106.4	93.0	93.7
1904.....	118.3	111.7	112.5	109.4	95.1	98.7
1905.....	120.6	112.3	111.6	110.0	93.4	96.6
1906.....	123.0	112.3	115.1	110.0	91.2	98.3
1907.....	133.0	120.5	123.5	115.4	92.6	99.2
1908.....	136.1	124.0	122.6	118.4	92.0	95.3
1909.....	135.6	124.6	116.7	119.0	93.0	94.0
1910.....	140.8	127.5	124.4	124.4	91.8	95.4
1911.....	152.8	131.6	126.9	127.0	92.3	97.2
1912.....	153.1	131.6	126.9	123.9	90.4	98.1

The choice of the period of 1892 to 1899, taken for the base rate in this table, instead of 1890 to 1899, is due to the fact that the Interstate Commerce Commission figures of daily compensation only date back to 1892. While the difference is entirely negligible, so far as the rates of pay are concerned, it works a material difference in the case of passenger and freight rate averages because of sharp reductions in both between 1890 and 1892.

The four classes of employes were chosen because they are the most numerous and draw the largest aggregate compensation from the railway treasury—each class being paid well over \$100,000,000 annually. In 1912 the four divided nearly 50% of the total payroll. The other trainmen represent the more highly organized railway employes; the "other shopmen" are members of mechanic unions not distinctively in transportation service and the other two classes are more or less representative of unorganized day labor.

These figures of the advancing price of labor and all commodities on one side and stationary or reduced rates on the other, coupled with imperative demands for increased improved and safer service, form the railway dilemma of today from which there is no relief in enormous revenues at rates petrified by hostile regulation.

Government ownership would solve the problem by making the rates to meet the market in which it buys labor, supplies and improved facilities.

Enlightened regulation would hasten to permit the railways to do the same, more efficiently, more economically and without endangering the Republic.

IV CAPITALIZATION

"What about over capitalization?" "What about watered stock?" and "What about exorbitant dividends?" are the current questions with which every plea for a fair deal to American railways is met.

Well here are the facts.

ACTUAL CAPITALIZATION.

248,888 Miles of Operated Line	
Total Capital Stock and Funded Debt.	\$19,694,987,553
Capital Stock and Funded Debt Owned by Roads.....	5,037,442,484
Net Capital.....	\$14,657,545,069
Per mile of line owned (238,300 miles).....	\$61,508
Per mile of track owned (341,782 miles).....	41,204

Is this over capitalization? Compare the figures per mile with those of European railways on another page.

Perhaps the sceptical reader may question the propriety of deducting \$5,037,442,484 for the stocks and bonds in the railway treasuries. Well these stocks and bonds were paid for out of the total issue of securities, and in the year 1912 the roads reporting to this Bureau received no less than \$257,121,010 from other income, nearly all of which came from these stocks and bonds. This is over 5% on the securities owned.

Perhaps the reader is sceptical about the returns to this Bureau. Well in 1911 the Interstate Commerce Commission reported that \$308,881,892 "other income" had been received by all the operating roads, and in 1910 \$252,219,946 was received from "other income," over 80% of which was dividends and interest on securities "owned or controlled."

So the over capitalization and watered stock bogeys are relegated to the limbo of falsehoods to which demagogues chiefly resort for their so-called facts.

ACTUAL DIVIDENDS.

And now what about the exorbitant dividends?

The 386 roads reporting to this Bureau operating 236,444 miles in 1912 had \$7,016,703,076 capital stock and owned \$3,136,345,433 capital stock in operating and leased roads. The revenues from operation of these roads amounted to \$2,806,177,194, the largest in

their history. After paying operating expenses, taxes, rent of road interest, reserves for depreciation and betterments, deficits of weak companies which amounted to \$32,986,563, and miscellaneous deductions, all they had left of these enormous receipts for dividends or anything else was \$60,314,175.

But these 386 roads did pay \$246,621,701 dividends on common and preferred stock.

How did they manage it?

Why out of the \$257,121.010 "other income," mostly from the \$3,136,345,433 railway capital stock owned by them. They simply paid dividends out of dividends received.

As a matter of fact the net dividends paid out of operating revenues and rental of leased lines in 1912 did not amount to \$200,000,000.

The total interest and dividend charge on the operating revenues of the railways of the United States in 1912 did not amount to \$500,000,000, which is only 3.42% on their net capitalization.

NET CAPITALIZATION IN 1912.

Following the formula adopted by Prof. Henry C. Adams when official statistician for the Commission to ascertain the only capitalization that "measures the claim of railway securities on railway revenues," the returns to this Bureau from 236,444 miles of operated line (196,831 owned and 39,613 leased) yield the following result for the year ending June 30, 1912:

SUMMARY SHOWING CAPITALIZATION OF 386 COMPANIES OPERATING 236,444 MILES OF LINE FOR THE YEAR ENDING JUNE 30, 1912.

Item	Capitalization (196,831 Miles Owned) 1912	Capitalization (236,444 Miles Operated)
Capital Stock.....	\$7,016,703,076	\$16,633,703,221
Funded Debt.....	9,588,164,232	
Receivers' Certificates.....	28,835,913	
Rental 39,613 miles, \$130,023,906 at 5%.....		2,600,478,140
Total.....		\$19,234,181,361
Less—		
Deductions for Railway Stock Owned.....	\$3,136,345,433	5,037,442,484
Deduction for Funded Debt Owned.....	1,901,097,051	
Net Capitalization, 1912 (236,444 Miles).....		\$14,196,738,877
Net Capitalization per Mile Operated.....		60,043

Besides the railway stocks and bonds reported as owned by the companies included in this statement on June 30, 1912, they owned \$678,060,706 stocks and \$198,878,377 bonds other than railway issues and \$154,312,034 miscellaneous securities. The income from these \$1,027,251,117 securities, amounting to over \$35,000,000, relieved railway revenues of just so much of their capital charge.

NET CAPITALIZATION OF ALL RAILWAYS, 1912.

Accepting \$14,196,738,877 as the net capitalization of the 236,444 miles of line reporting to this Bureau it only remains to place a reasonable estimate on the 12,444 miles not covered by such reports, in order to arrive at a close approximation of the net capitalization of all the railways in the United States. Estimating this as high as \$40,000, where \$30,000 would be liberal the account would stand:

SUMMARY SHOWING NET CAPITALIZATION OF ALL THE RAILWAYS IN THE UNITED STATES ON JUNE 30, 1912.

Net Capitalization 236,444 Miles shown supra	\$14,196,738,877
12,444 Miles not Represented at \$40,000 per Mile.....	497,760,000
Total for 248,888 Miles of Operated Line.....	\$14,694,498,877
Less Assigned to Other Properties in 1910.....	36,953,808
Net Capitalization of All Railways in United States in 1912.....	\$14,657,545,069
Net Capitalization per Mile of Line.....	61,508
Net Capitalization per Mile of Track.....	41,204

GROSS AND NET CAPITAL, 1912 TO 1889.

Prior to 1907 the Commission included in its statistical report a most valuable table giving the amount of stocks and bonds outstanding, with the amount of both owned by the companies, from which it was possible to compute approximately their net capitalization for any given year. Under the new accounting this statement has been omitted and nothing substituted in its place. As the railways are still requested to furnish the data, and in order to preserve the continuity of this important record, the next statement shows the gross railway capital, securities owned, net capital outstanding in the hands of the public, together with its amount per mile since 1889, when these figures were first compiled.

Except for 1911 and 1912, the figures in this statement are from official reports and it is to be regretted that the Commission report for 1911 is not available to this writing, except as to the gross cap-

italization, which was given in a press summary as \$19,208,935,081, thus confirming the Bureau's approximation of \$19,187,526,885 a year ago. With this explanation the statement follows:

SUMMARY OF GROSS RAILWAY CAPITAL, AMOUNT OF RAILWAY SECURITIES OWNED AND NET CAPITALIZATION OF THE RAILWAYS OF THE UNITED STATES, 1912 TO 1889.

Year	Gross Railway Capital	Railway Securities Owned	Net Railway Capital	Net Railway Capital per Mile
1912 Bureau.....	\$19,694,987,553	\$5,037,442,484	\$14,657,545,069	\$61,508
1911 ".....	19,187,526,885	4,753,216,781	14,434,309,804	59,345
1910 Official %.....	18,417,132,238	4,078,556,298	14,338,575,940	62,657
1909 % ".....	17,487,868,935	†3,776,001,202	13,711,867,733	59,259
1908 % ".....	16,767,544,827	3,933,953,317	12,833,591,510	57,201
1907 ".....	16,082,146,683	3,161,794,135	12,920,352,548	58,298
1906 ".....	14,570,421,478	2,898,480,829	11,671,940,649	54,421
1905 ".....	13,805,258,121	2,638,152,129	11,167,105,992	53,328
1904 ".....	13,213,124,679	2,501,330,601	10,711,794,078	52,099
1903 ".....	12,599,990,258	2,318,391,953	10,281,598,305	51,559
1902 ".....	12,134,182,964	2,208,518,793	9,925,664,171	50,961
1901 ".....	11,688,147,091	2,205,497,909	9,482,649,182	49,925
1900 ".....	11,491,034,960	1,943,050,349	9,547,984,611	51,092
1899 ".....	11,033,954,898	1,601,913,167	9,432,041,731	51,215
1898 ".....	10,818,554,031	1,521,386,255	9,297,167,776	51,856
1897 ".....	10,635,008,074	1,466,936,176	9,168,071,898	51,396
1896 ".....	10,566,865,771	1,501,346,914	9,065,518,857	51,141
1895 ".....	10,346,754,229	1,447,181,534	8,899,572,695	51,421
1894 ".....	10,190,658,673	1,544,058,670	8,646,600,008	50,358
1893 ".....	9,894,625,239	1,563,022,233	8,331,603,006	50,293
1892 ".....	9,686,146,813	1,391,457,053	8,294,689,760	52,348
1891 ".....	9,290,915,439	1,282,925,716	8,007,989,723	50,858
1890 ".....	8,984,234,616	1,406,907,001	7,577,327,615	49,473
1889 ".....	8,574,046,742	1,151,972,901	7,422,073,841	50,013

* Does not include returns for switching and terminal companies.

† If railway securities owned in 1908 is correct, the amount for 1909 is about \$300,000,000 below what it should be.

DISTRIBUTION OF RAILWAY CAPITAL BY GROUPS.

The next summary shows the distribution of railway capital among the territorial groups, according to the Commission's reports for the years 1890, 1900 and 1910 and as reported to the Bureau for 1912. The last, it should be remembered, cover only 95% of the mileage of the country and are not territorially absolutely coincident with the Commission's groups:

SUMMARY OF RAILWAY CAPITAL ON JUNE 30, 1890, 1900, 1910 AND 1912 BY GROUPS. . .

Territory Covered	1890	1900	1910	1912
			240,830 Miles Represented	196,831 Miles Represented
Group I.....	\$ 377,417,302	\$ 472,329,210	\$ 799,627,536	\$ 580,170,140
Group II.....	2,032,242,616	2,337,874,067	3,543,053,383	3,330,272,996
Group III.....	1,309,390,715	1,490,997,662	2,414,370,374	1,578,604,818
Group IV.....	410,704,029	631,863,020	960,183,380	1,161,361,854
Group V.....	742,670,372	903,681,993	1,346,913,136	1,064,743,179
Group VI.....	1,818,588,865	2,024,541,064	3,102,203,094	2,942,411,882
Group VII.....	443,136,450	560,763,313	1,047,244,431	872,293,419
Group VIII.....	1,047,724,401	1,395,350,723	2,260,370,943	2,952,373,666
Group IX.....	372,982,285	511,034,132	808,905,131	632,566,998
Group X.....	882,876,385	1,162,599,776	2,134,260,830	1,490,068,356
Total.....	\$39,437,343,420	\$11,491,034,960	\$18,417,132,238	\$16,604,867,308
Less Stocks and Bonds Owned..	1,406,907,001	1,943,050,349	4,078,556,298	5,037,442,484
Net Railway Capital.....	\$8,030,436,319	\$9,547,984,611	\$14,338,575,940	\$11,567,424,824

*Includes \$453,108,804 "other forms of indebtedness" excluded in other years.

†Includes \$36,953,808 assigned to "other properties."

The discrepancy which the student must observe between the totals for 1910 and 1912 is due to the fact that the figures for 1910 include operating and non-operating, lessor and lessee roads, whereas those for 1912 are confined strictly, as they should be, to operating roads who paid \$130,023,906 rental for the 39,613 miles of line not represented in their capitalization. If their rental be capitalized at 5% it adds \$2,600,478,140 to the total for 1912, increasing it to \$14,167,902,964. To this has to be added the capitalization of the 12,444 miles of line not reporting to the Bureau as well as the sum borrowed on receiver's certificate amounting to \$28,835,913.

Owing to the complexity of inter-corporate ownership in the capital issues of railway companies, no attempt has been made to offset stocks and bonds owned against the respective groups, so as to arrive at the net capitalization of each group.

NEW RAILWAY CAPITAL IN 1912.

According to the reports to this Bureau for the year ending June 30, 1912, there was an increase of \$272,049,938 in gross railway capitalization outstanding over the preceding year, of which \$243,-434,799 was in funded debt and only \$28,615,139 in capital stock. The amount in receiver's certificates showed an increase of \$15,-880,410 during the twelvemonth. The railway investment in stocks and bonds owned increased \$284,224,703, leaving an apparent net decrease of \$12,174,765 in net capitalization.

On the other side of the ledger there was an increase of 4,327 miles of line, 9,171 miles of track, 981 locomotives, 1,673 passenger

cars and 32,579 freight cars. The cost of this additional equipment alone represented a fresh investment of over \$62,000,000 during the year.

In its issue of January 25, 1913, the *Commercial and Financial Chronicle* gives \$1,816,008,540 as the total of securities listed on the New York Stock Exchange for the first time during the *calendar* year 1912, divided as follows:

	Bonds	Total
Steam Railway.....	\$209,752,900	\$654,977,750
Electric Railway.....	177,401,500	
Miscellaneous.....	267,823,350	
	Stocks	
Steam Railway.....	\$136,034,100	\$1,161,030,790
Electric Railway.....	109,405,900	
Miscellaneous.....	915,590,790	
Total.....		\$1,816,008,540

The most casual reader cannot escape observing that of this grand total securities put on the market in 1912, only \$345,787,000 or 19% was for railway capital. But this is not all. Behind these totals are the facts that no less than \$26,201,000 of the bonds, and \$77,440,000 of the stock was issued to retire other securities or was old securities just listed, leaving the net issue of railway securities for the year as follows:

Steam Railway Bonds.....	\$183,551,000
Steam Railway Stocks.....	58,594,100
Total.....	\$242,145,100

This is \$80,451,450 below the small net issue of 1911 and over a billion dollars below the accumulating needs of fresh capital to meet the deferred necessities of the transportation industry. Capital which the preceding statement shows is abundant for electric railways and other industries will not invest freely in an industry which is under the harrow of hostile regulation.

The railway note issues for 1912, which are seldom listed on the exchanges and which represent temporary expedients while waiting for something to turn up, amounted to \$202,137,114, compared with \$187,175,000 in 1911. These notes for the most part bear interest at 5% and have one, two and three years to run. It is impossible to say what proportion of their proceeds was used to refund other obligations.

Bonds, stocks and notes together account for less than \$450,-000,000 fresh capital put into a plant valued at \$22,000,000,000, required to take care of from 6% to 8% increased traffic every year. As a financial proposition it presents staggering phases in more senses than one.

CAPITALIZATION OF FOREIGN RAILWAYS.

If anything were needed to demonstrate the remarkably low figure at which American railways have been built, equipped and financed it would be supplied by the next statement which gives the capital cost or cost of construction of the railways of the principal foreign countries compiled from the latest available sources:

SUMMARY OF CAPITALIZATION OF PRINCIPAL FOREIGN RAILWAYS.

Year	Country	Miles Line	Capital or Cost of Construction	Per Mile
Europe				
1911	United Kingdom.....	23,417	\$6,447,969,398	\$275,354
1910	German Empire.....	36,740	4,163,615,519	113,326
1908	Russian Empire*	41,838	3,378,839,810	80,902
1909	France.....	25,017	3,593,660,000	143,648
1910	Austria.....	14,038	1,654,207,119	117,837
1910	Hungary.....	12,821	858,732,000	66,977
1910-11	Italy (State).....	8,908	1,131,300,000	126,886
1907	Spain (State).....	8,980	692,818,000	77,151
1908	Portugal.....	1,465	162,385,280	110,830
1909	Sweden.....	8,366	277,952,716	33,224
1911	Norway.....	1,891	81,467,176	43,087
1911	Denmark (State).....	1,215	70,277,640	57,841
1910	Belgium (State).....	2,685	504,210,184	187,787
1910	Netherlands.....	1,978	163,798,304	82,810
1910	Switzerland.....	2,924	341,208,367	116,692
1911	Roumania.....	2,153	186,670,372	86,702
1909	Servia (State).....	350	31,440,000	89,830
1909	Bulgaria (State).....	1,048	60,113,551	57,456
	Total Europe including Asiatic Russia.....	195,884	\$23,800,664,235	\$121,453
Other Countries				
1912	Canada.....	26,727	\$1,585,724,797†	\$59,330
1909	British India.....	32,099	1,448,700,000	45,135
1910	Argentine Republic†.....	17,381	868,914,950	49,981
1911	Japan (State).....	4,767	411,598,253	86,343
1912	New South Wales||.....	3,831	260,613,180	68,288
1911	New Zealand||.....	2,761	153,448,880	55,574
1911	Queensland||.....	3,929	132,982,560	33,820
1911	Victoria||.....	3,505	206,804,550	59,000
1912	United States.....	248,888	14,657,545,069	61,508

*Includes Asiatic Russian railways.

||New South Wales railways are 4 ft. 8 1-2 in. gauge; New Zealand and Queensland 3 ft. 6 in., and Victoria (all but 121 miles) 5 ft. 3 in.

†Including Government subsidy.

‡About two-thirds 5 ft. 6 in. gauge, remainder 3 ft. 3 1-2 or 2 ft. 6 in. gauge.

Japan affords the latest illustration of how capitalization of railways can be swelled through government ownership. Under private ownership Japan's railways were capitalized at \$42,800 per mile. When taken over by the state, their capital was increased to \$78,820 in 1909, to \$83,220 in 1910 and to \$86,343 in 1911. Jonah's gourd was the eastern prototype of Japanese state railway financing. But it must be admitted that the Germans set the example. Twenty-one years ago (1891) Germany's railways were capitalized at 250,390 marks per kilometer, in 1900 at 270,455 marks and in 1910 at 292,753, or an increase of 42,363 marks per kilometer, or \$16,246 per mile in nineteen years. An American contractor with German labor at Japanese wages could build and equip the entire German railway system, ex land damages, for \$16,246 per mile. However, in the matter of railway financing the Germans are a phlegmatic people compared to the vivacious modernized Japanese.

V

COST OF CONSTRUCTION

No feature of railway statistics is more illusive than that which attempts to get at the investment in road and equipment. In 1910 the Commission, after excluding switching and terminal companies, than which there is no more essential, inseverable and expensive railway investment, arrived at \$14,387,816,099 as the net investment in road and equipment for 226,114 miles of line. This figure was incorporated in the official balance sheet for that year.

From the returns to this Bureau, identical with those made to the Commission for the year 1912, the following statement of the investment in 236,444 miles of operated line has been compiled:

COST OF ROAD AND EQUIPMENT FOR THE YEAR ENDING JUNE 30,
1912 (236,444 MILES OF LINE REPRESENTED).

Item	Amount
Investment in Road (196,831 miles represented).....	\$8,062,975,146
Investment in Equipment.....	1,919,756,292
Investment Unsegregated.....	2,913,474,712
Total Investment Reported.....	\$12,896,206,150
Rental of 39,613 Miles of Line Capitalized at 5 per cent.....	2,600,478,140
Total 1912.....	\$15,496,684,290
Total 1911 Bureau.....	15,251,636,991
Total 1910 Official Balance Sheet.....	14,387,816,099

The reader hardly need be told that these figures do not come within billions of representing the first investment in American railways. He has seen in the chapter on equipment how that item which has been practically replaced during the last fifteen years, must have cost, at a reasonable estimate, about \$3,500,000,000. The accounts so far as kept show that equipment has cost less than 20% (19.24) of the total. Applying this percentage to the known cost of equipment would indicate about \$18,000,000,000 as the actual cost of railway property up to June 30, 1912.

Moreover, there is no means of even approximating the millions upon millions expended since the inception of railways eighty years

ago upon lines whose records, if ever kept, have been lost or which have gone through receivership and reorganizations which have overtaken 131,000 miles of American railways whose capitalization reaches nearly \$8,000,000,000.

Nor does it include the appreciation of railway property, especially at terminals, during the past three-quarters of a century. There can be no claim that there is any "unearned increment" about such appreciation, for it is the creation of the railways. The rail has brought increase of billion upon billion to the land value of almost every state in the Union.

PHYSICAL VALUATION OF AMERICAN RAILWAYS.

Now that both branches of Congress have yielded to the agitation for a physical valuation of the railways, for which there is no valid reason, except clamor based on the false popular impression that there is some definite relation between rail investments and rail rates, it is timely to recall that up to date every valuation made by hostile appraisers has demonstrated the excess of values to capital securities.

The following statement gives the results of official state valuation of railway property in Washington, South Dakota, Minnesota and Wisconsin:

Steam Railroads of	Cost of Reproduction	Present Value	Capitalization
Washington.....	\$194,057,240	\$175,797,025	\$161,582,000
South Dakota.....	106,494,503	91,695,132	109 444,600
Minnesota.....	360,961,548	309,706,514	300,027,676
Wisconsin.....	293,803,322	240,718,711	225,000,000
Total.....	\$958,316,613	\$817,917,382	\$796,054,276

Since these valuations were made the state board of equalization of Washington has placed an aggregate valuation of \$342,515,593 on the property of the steam railroads of that state, or nearly double the "present value" found by the Railroad Commission seven years ago.

In 1910 the railways in Wisconsin paid \$2,858,000 taxes. If the railways of Wisconsin are getting a square deal with other taxpayers this indicates that the value of their property is over half a billion.

In February, 1911, a Commission appointed by the Railroad Commissioners of Massachusetts to value the assets and liabilities of the New York, New Haven and Hartford Railroad Company made the following finding:

Appraised Value of All Property.....	\$495,759,638
Liabilities Validated.....	394,147,564
Adjustment Surplus.....	\$101,612,074

During the past year a physical valuation of the transportation property of the Lehigh Valley Railroad, exclusive of the coal lands and collieries, has been made by an engineering and accounting force unconnected with the company's staff. The detail figures have not been published but the result is known to be in the neighborhood of \$300,000,000. To this should be added company investments in railway securities valued on their income at over \$20,000,000, making a total of over \$320,000,000 against a capital charge of \$147,113,669.

The railroads have good reason to welcome a physical valuation of their property, as it will forever lay the bogey of over capitalization. It will serve no other useful purpose except to put an appropriation of several millions at the disposal of the Commission or whoever appoints the appraisers.

VI

OWNERSHIP OF AMERICAN RAILWAYS

At the date of the last election of directors prior to June 30, 1912, the records of the 386 roads reporting to this Bureau showed 378,302 shareholders, an increase of 14,495 over the number reported for practically the same roads in 1911.

This is nearly two shareholders per mile of line owned. Assuming that the same proportion maintains for the mileage not covered by these reports would yield a total of approximately 480,000 shareholders in the 248,888 miles of railway in the United States.

As the returns on this item are not complete, it is safe to place the number of shareholders in American railroads at half a million.

The following statement shows how the number of shareholders in some of the principal roads have increased since the Interstate Commerce Commission reported that there were 327,785 shareholders in 1,182 roads in 1904:

Name of Company	Shareholders	
	1904	1912
Pennsylvania R. R.....	44,175	74,002
Atchison, Topeka & Santa Fe.....	17,823	31,738
New York Central & Hudson River.....	11,781	22,247
New York, New Haven & Hartford.....	10,842	21,048
Union Pacific.....	14,256	21,600
Great Northern.....	383	17,841
Southern Pacific.....	2,424	14,387
Northern Pacific.....	368	13,987
Chicago, Milwaukee & St. Paul.....	5,832	11,819
Baltimore & Ohio.....	7,132	11,414
Illinois Central.....	9,123	9,987
Erie.....	4,309	7,847
Chicago & North-Western.....	4,109	8,564
Boston & Maine.....	7,402	8,105
Norfolk & Western.....	2,911	5,323
Denver & Rio Grande.....	2,910	4,928
Missouri Pacific.....	1,861	4,382
Chesapeake & Ohio.....	1,478	4,138
Louisville & Nashville.....	1,672	3,318
Total.....	149,791	297,575
Increase per cent.....		98.7%

Thus it appears that the number of shareholders in nineteen companies has practically doubled in eight years. This means a distribution of ownership in American roads among the people which cannot be ignored much longer by the powers that control regulation.

The share of the average shareholder in the revenues of the railways is less than the share of the average employe.

Back of this ownership of railway stock reposing faith in the honesty and stability of republican institutions is the unnumbered army of investors in railway bonds. It is estimated that they outnumber the stockholders two to one directly, while indirectly they are held by banks, savings banks, insurance companies, educational and benevolent institutions and trustees of all manner of funds to an extent that involves the fortunes of millions upon millions of citizens in the sane regulation of railway affairs. Every advance in railway expenditures unattended by a relative advance in railway income impairs the value of these obligations. Every imposition of unremunerative expenditures impairs their value. Every increase in wages to meet the "cost of living" without advancing the price of the product of railway labor by as much impairs the value of these railway securities.

VII

PUBLIC SERVICE OF THE RAILWAYS

33,510,673,000 passengers carried one mile at.....	1.99 cents per mile
267,313,687,000 tons of freight carried one mile at.....	7.41 mills per mile

To this point these pages have been concerned with the provision the railways of the United States have made to fulfil their obligations as common carriers for a people of nearly 97,000,000 scattered over a vast area of over 3,000,000 square miles. At a cost of surely \$18,000,000,000, they have provided, in round numbers, 250,000 miles of line, 370,000 miles of track, 62,000 locomotives, 51,000 passenger cars, and 2,200,000 freight cars, maintained and operated by an army of 1,730,000 men whose yearly pay approaches \$1,300,000,000.

The character of the physical equipment thus provided is attested by the fact that the average American locomotive is twice as powerful as the average German locomotive and the average American freight car has nearly three times the carrying capacity of the German car. The road and structures to carry this superior equipment are necessarily relatively superior. Yet the capital cost of the American privately owned and publicly regulated railway is barely half as much per mile as the state owned and operated railway of Germany.

The American railway employe who handles this equipment is paid from two to three times as much as the German railway employe.

This chapter has to do with the public service performed by this private agency under federal and state regulation of the most exacting character. The first statement covers the salient features of this service in the handling of passengers and freight during the years ending June 30, 1907, 1910, 1911 and 1912:

COMPARATIVE SUMMARY OF PASSENGER AND FREIGHT SERVICE FOR THE YEARS
ENDING JUNE 30, 1912, 1911, 1910 AND 1907.

Item (m=000 omitted)	1912 Bureau Figures	1911 # Official Figures	1910 # Official Figures	1907 Official Figures
Miles Represented.....	236,444	246,124	240,830	227,454
Passenger Service				
Passengers carried (m).....	972,008	997,409	971,683	873,905
Passengers carried 1 mile (m).....	32,820,623	33,201,694	32,338,496	27,718,554
Passengers carried 1 mile per mile of line.....	138,810	134,900	138,169	123,259
Mileage of revenue passenger trains (m).....	572,294	No data†	549,015	509,328
Average number of passengers in train.....	57.3	No data	56	51
Average journey per passenger, miles.....	33.76	33.27	33.50	31.72
Passenger car miles (m).....	3,194,452	No data	2,993,170	.....
Average passengers per car mile.....	10.27	No data	10.83	.....
Freight Service				
Number of tons reported carried (m).....	1,765,512	1,781,637	1,849,900	1,556,559
Tons carried 1 mile (m).....	261,416,643	253,783,701	255,016,910	218,802,986
Tons carried 1 mile per mile of line.....	1,101,390	1,053,566	1,071,086	953,986
Mileage of revenue freight trains (m).....	605,236	No data	635,450	568,854
Average number of tons in trains.....	432	383	380	362
Typical haul of average railway, miles.....	148	141	138	141
Mileage of revenue mixed trains (m).....	34,961	No data	35,807	36,236
Total revenue train mileage (m).....	1,212,491	No data	1,221,852	1,112,452
Total mileage of freight cars (m).....	19,319,307	No data	18,981,573	17,169,413
Average freight car miles per day.....	23.4	24.0	24.3	22.7

Exclude returns from switching and terminal companies, included in 1911 and 1907.

† "No data" merely means official report not published when this report goes to press.

This table bears testimony to the continued adequacy of the passenger service and the amazing efficiency of the freight carrying service of American railways. An actual decrease in the number of passengers to be carried was accompanied by an actual increase in passenger train and car mileage. The average number of passengers per train according to the reports to this Bureau from practically the same roads was also less in 1912 than in 1911, the figures being 57.3 and 58 respectively. The average journey was slightly shorter, although longer than the official average for 1911.

By reason of the greater length of the average haul the freight ton mileage in 1912 exceeded the record figures of 1910 and were the highest in the history of American railroading. When the final returns are in the aggregate will probably reach the enormous total of over 267,000,000,000 ton miles. This is considerably more than double the freight ton mileage of all Europe, including the British Isles.

While the average freight car journey per day was slightly less than in 1911, the difference was far more than made up by the load

carried by each train. It should always be remembered that this average freight car movement is largely spent standing still. It covers all time and delay in placing, loading and unloading, making up and sorting out trains, to say nothing of the time lost in shops making repairs. The 48 hours free time, more or less, at either end is charged in the freight car's day's work.

PASSENGER TRAFFIC, 1912-1888.

The next statement presents a comprehensive review of the passenger traffic service and revenue of the railways of the United States, from the time the Commission began compiling the data down to 1912:

Year	Passengers Carried (Millions)	Passengers Carried One Mile (Millions)	Mileage Passenger Trains (Millions)	Average Passengers in Train	Average Journey Miles	Passenger Revenue (Millions)	Average Receipts per Passenger Mile (Cents)
1912 Bureau	972	32,820	572	57.3	33.7	\$653	1.991
1911 Official*	997	33,201	†558	†58	33.2	657	1.974
1910* "	971	32,338	549	56	34	628	1.938
1909*.....	891	29,109	506	54	33	563	1.928
1908*.....	890	29,082	505	59	33	566	1.937
1907.....	873	27,718	509	51	32	564	2.014
1906.....	797	25,167	479	49	31	510	2.003
1905.....	738	23,800	459	48	32	472	1.962
1904.....	715	21,923	440	46	31	444	2.006
1903.....	694	20,915	425	46	30	421	2.006
1902.....	649	19,689	405	45	30	392	1.986
1901.....	607	17,353	385	42	29	351	2.013
1900.....	576	16,038	363	41	28	323	2.003
1899.....	523	14,591	347	41	28	291	1.978
1898.....	501	13,379	334	39	27	267	1.973
1897.....	489	12,256	335	37	25	251	2.022
1896.....	511	13,049	332	39	26	266	2.019
1895.....	507	12,188	317	38	24	252	2.040
1894.....	540	14,289	326	44	26	285	1.986
1893.....	593	14,229	335	42	24	301	2.108
1892.....	560	13,362	317	42	24	286	2.126
1891.....	531	12,844	308	42	24	281	2.142
1890.....	492	11,847	285	41	24	260	2.167
1889.....	472	11,553	277	42	25	254	2.199
1888.....	412	10,101	252	40	24	237	2.349
Increase 1888 to 1912	136%	225%	127%	43%	40%	175%	.....
Decrease							18%

*Exclusive of switching and terminal companies in 1903 and 1909.

†These figures are supplied from the Bureau's 1911 report.

While this whole table presents an illuminating reflection of the railway passenger service for nearly a quarter of a century, its most

significant columns are those giving the passenger mileage, which has increased 225%, and that giving the passenger revenue, which has increased only 175%. This discrepancy against the railways is accounted for in the last column, which shows a decrease of 18% in the average receipts per passenger mile.

The gradual increase in the average passengers per train is the most satisfactory feature of this table from the railway point of view. The average cost of running a passenger train throughout the United States is roughly approximated at one dollar. If this is correct an average of 50 passengers per train at 2 cents a mile is necessary to meet the cost. A glance at the table shows that this condition has only been met since 1907, and another in the succeeding statement of the passenger service by groups as assigned by the Commission in 1910 shows that it does not obtain in four out of the ten groups and has a scant margin in two others. Only in the New England group is the passenger service sufficiently dense to render it independent of the freight revenues. So exacting has the public become in the matter of trains, cars, stations and the conveniences of travel that it is doubtful if the dollar per train mile covers the cost. The statement referred to follows:

SUMMARY OF PASSENGER SERVICE ASSIGNMENTS BY GROUPS FOR THE YEAR ENDING JUNE 30, 1910.

Territory	Passengers Carried (Millions)	Passengers Carried One Mile (Millions)	Mileage Passenger Trains (Millions)	Average Passengers in Train	Average Journey Miles	Passenger Revenue (Millions)	Average Receipts per Passenger Mile (Cents)
Group I....	153	2,996	33	76	20	51	1.718
Group II...	332	7,362	115	63	23	125	1.695
Group III..	101	4,042	78	51	41	75	1.846
Group IV...	30	1,034	23	42	36	23	2.176
Group V...	53	2,139	48	41	40	49	2.256
Group VI..	144	5,890	103	53	41	111	1.887
Group VII..	16	1,558	24	60	94	32	2.073
Group VIII	54	2,925	54	49	54	61	2.079
Group IX...	23	1,232	23	48	53	29	2.321
Group X...	65	3,110	43	67	43	72	2.292
United States....	891	32,338	549	56	34	623	1.938

In the early years of the Commission, Professor Adams, then its statistician, adopted a formula by which he sought to ascertain the cost of passenger service, with the following results:

	1888	1889	1890	1891	1892	1893
Average cost of carrying a passenger one mile (cents).....	2.042	1.993	1.917	1.910	1.939	1.955

No more satisfactory formula has been found, and it will be perceived that the average receipts today are approximately the same as the average cost of the passenger service two decades ago. In the meantime the service is incomparably better and is produced at a higher cost for labor, equipment and terminal facilities and conveniences.

Compare these figures with those in the last columns of the two next preceding tables. The margin of receipts above cost has been submerged more than once since 1893 and is perilously near the brink today.

RECEIPTS FROM MAIL AND EXPRESS.

No part of the income from the passenger service has attracted more attention during the past year than that derived from carrying the mails and express matter. The two together contribute only 4.4% of railway revenues and carrying the mail alone exacts more than that percentage of expenses. And it is an exaction for the government imposes what terms it pleases both as to service and pay.

Twelve years ago a Joint Commission of Congress, after an exhaustive investigation, declared "that the prices now paid to the railroad companies for the transportation of the mails are not excessive," and recommended that no reduction thereof be made. Since then the demands of the Post Office Department have become more onerous and the rate of pay has been steadily reduced.

Exactly what effect the introduction of the parcel post will have ultimately on railway mail pay no one can prophecy. But there is one phase of its adoption that is positively discreditable to the government. Mail, as the reader is aware, is carried by weight. This is not determined by the price but by quadrennial weighing in different districts of the country. Each district weighing establishes the rate of pay in that district for four years so that all increases in weight are carried free for four years. The parcel post-mail has been introduced with no provision for reweighing to ascertain anything about the increased tonnage it imposes on the railroads.

Not only does this work a manifest injustice to the railways in depriving them of increased pay for increased mail service, but they suffer a loss for every parcel that goes by mail instead of

express. Under their contracts with the express companies the railways get a fixed percentage of the gross express transportation receipts. Out of every dollar the express company takes in the railways get from 45 to 55 cents. On every dollar's business transferred from the express company to the parcel post the railways lose that 45 or 55 cents and they carry the parcel transferred for nothing.

There was no need of this last illustration of the arbitrary power of the government to demonstrate the loss the railways have had to endure in carrying the mails. Premising that the increase in revenues from express business in the following statement shows a normal growth, the reader's attention is directed to the contrast afforded by the figures of railway mail revenues for the decade ending June 30, 1912:

SUMMARY OF RAILWAY RECEIPTS FROM MAIL AND EXPRESS, YEARS
ENDING JUNE 30, 1901 TO 1912.

Year	Mail		Express	
	Revenues	Percentage of Earnings	Revenues	Percentage of Earnings
1902 Official	39,963,248	2.31	34,253,459	2.07
1903 "	41,709,396	2.19	38,331,964	1.98
1904 "	44,499,732	2.25	41,875,636	2.12
1905 "	45,426,125	2.18	45,149,155	2.17
1906 "	47,371,453	2.04	51,010,930	2.19
1907 "	50,378,964	1.94	57,332,931	2.21
1908 "	48,517,563	2.03	58,602,091	2.45
1909* "	49,380,783	2.04	59,647,022	2.47
1910* "	48,913,888	1.78	67,190,922	2.44
1911* "	50,702,625	1.82	70,725,137	2.54
1912 Bureau figures.....	50,458,769	1.80	73,053,799	2.60
Increase per cent.....	28.8%		113.3%	

*Excludes switching and terminal companies.

Mark how the proportion of mail receipts to total revenues has steadily decreased during the decade, while that for express has steadily increased until they have changed places in relation to earnings. Also observe how the absolute increase of railway mail pay has increased only one-quarter as fast as the revenues from express.

Perhaps the reader thinks that these differences are due to the failure of the mail business to keep pace with the express business. But the reports of the Post Office do not sustain any such explanation as the following table comparing railway mail pay and postal revenues during the same period testifies:

SUMMARY COMPARING RAILWAY MAIL PAY WITH NUMBER OF
RAILWAY MAIL CLERKS AND POSTAL REVENUES, 1902 TO 1912.

Year	Railway Mail Revenues	Number of Railway Mail Clerks	Postal Revenues
1902.....	39,963,248	9,627	121,848,047
1903.....	41,709,396	10,418	134,224,443
1904.....	44,409,732	11,621	143,482,624
1905.....	45,426,125	12,474	152,826,585
1906.....	47,371,453	13,598	167,932,783
1907.....	50,378,964	14,357	183,585,006
1908.....	48,517,563	15,295	191,478,663
1909.....	49,380,783	15,866	203,562,383
1910.....	48,913,888	16,578	224,128,657
1911.....	50,702,625	16,792	237,879,823
1912.....	50,458,769	16,636	246,744,015
Ten years' increase per cent.....	28.8%	72.8%	101.7%

Although the number of railway mail clerks showed a slight decrease in 1912, their pay increased from \$20,106,909 in 1911 to \$20,711,675 in 1912.

If the railways had been paid a proportionate share of the government postal revenues in 1912 equal to that paid them in 1902, their receipts for carrying the mail would have been over \$80,000,000 instead of \$50,458,769. Even an increase proportionate to the increase in railway mail clerks would have added nearly \$20,000,000 to their mail pay in 1912.

To be anything like commensurate to the service rendered, the most exacting and expensive in all railway operation, the railway mail pay in 1912 should have been over \$100,000,000. It has been demonstrated that what they did receive was actually \$25,000,000 below the cost of the service.

THE EXPRESS COMPANIES.

In 1912 the express companies paid the railways reporting to this Bureau \$73,053,799 for transporting their packages. In the reports of the express companies to the Interstate Commerce Commission it is denominated "Express Privileges" and for all the companies in 1912 amounted to \$78,576,294, or slightly under 50% of their receipts from operation, which were \$160,121,932.

These receipts from operation have been attacked directly by the Interstate Commerce Commission and indirectly by the inauguration of the parcel post service by the government. It is estimated that had the rates proposed by the Commission been in effect during the year ending June 30, 1912, it would have caused a reduc-

tion of nearly \$25,000,000 in express revenues. This would have meant a loss of \$12,500,000 to the railways.

The reader can figure for himself what effects these combined reductions will have on the finances of the express companies as set forth in the following income account compiled by the Commission:

SUMMARY OF INCREASE ACCOUNT OF EXPRESS COMPANIES AS REPORTED TO THE INTERSTATE COMMERCE COMMISSION FOR THE YEARS ENDING JUNE 30, 1910, 1911 AND 1912.

Item	1912	1911	1910
Number of Companies.....	12	13	13
Railway Miles Operated.....	248,618	243,472	237,868
Express Operations:			
Gross Receipts from Operation.....	\$160,121,932	\$152,612,880	\$146,116,315
Less Express Privileges.....	78,576,274	73,936,018	69,917,562
Operating Revenues.....	\$81,545,658	\$78,676,862	\$76,198,753
Operating Expenses.....	73,225,682	67,089,233	61,690,473
Net Operating Revenue.....	\$ 8,289,976	\$11,587,629	\$14,508,280
Net Revenue from Outside Operations.....	(a) 46,622	13,117	10,627
Total Net Revenue.....	\$ 8,243,353	\$11,600,746	\$14,518,907
Taxes Accrued.....	1,430,809	1,315,973	1,126,726
Operating Income.....	\$ 6,812,544	\$10,284,773	\$13,392,081
Other Income from Investments, etc.....	5,369,822	6,315,842	5,633,792
Gross Income.....	\$ 12,182,366	16,600,615	19,025,873
Total Deductions, Interest, etc.....	1,237,996	1,234,006	1,037,316
Net Corporate Income.....	\$10,944,370	\$15,366,609	\$17,988,557
Dividends Declared.....	4,625,832	5,848,082	5,928,103

(a) Deficit.

The amount paid to the railways for express privileges according to the above statement does not tally with the amount received by the railways on the same account by some \$5,500,000. The discrepancy is explained by the inclusion of Canadian express companies in the Commission's returns and allowance has to be made for the railways not reporting to the Bureau.

Unfortunately the Commission does not concern itself with the service rendered by the express companies, nor with the fact behind that service that about 70% of their gross operating revenues after deducting "express privileges" is paid to employes in salaries, wages and commissions.

THE FREIGHT TRAFFIC.

In what Prof. E. R. Johnson has truly described as "the most important service performed by the railroad" there was a gratifying improvement over the recession of 1911. But this was accompanied by a marked decline in the average receipts per ton mile, which very materially affected railway revenues.

The first statement under this title gives the ton mileage, revenue and receipts per ton mile with the changes by percentages for the years 1901 to 1912:

SUMMARY OF FREIGHT MILEAGE, REVENUE AND RECEIPTS PER TON MILE, 1901 TO 1912.

Year	Number of Tons Carried One Mile	Increase over Preceding Year (Per Cent)	Freight Revenue	Increase over Preceding Year (Per Cent)	Receipts per Ton-Mile (Mills)
1901 Official.....	147,077,136,040	.....	\$1,118,543,014	.....	7.50
1902 "	157,289,370,056	6.9	1,207,228,845	7.9	7.57
1903 "	173,221,278,993	10.2	1,338,020,026	10.8	7.63
1904 "	174,522,089,577	.7	1,379,002,693	3.0	7.80
1905 "	186,463,109,510	6.9	1,450,772,838	5.2	7.66
1906 "	215,877,551,241	15.7	1,640,386,655	13.1	7.48
1907 "	236,601,390,103	9.6	1,823,651,998	11.2	7.59
1908* "	218,381,554,802	D 7.7	1,655,419,108	D 9.2	7.54
1909* "	218,802,986,929	.2	1,677,614,678	1.3	7.63
1910* "	255,016,910,451	16.6	1,925,553,036	14.8	7.53
1911* "	253,783,701,839	D .4	1,925,950,887	.0	7.57
1912 (Bureau).....	261,416,643,000	3.0	1,936,237,488	.5	7.41
Eleven years' increase.....	.....	77.5%	.....	73.1%	.....

NOTE.—In 1911 the miles of line represented was 246,124, in 1912, 236,444.

*Excludes figures of switching and terminal companies.

D Decrease.

The percentages of increase show that during the period of eleven years the freight service rendered has increased slightly more than the revenues therefrom. This fact is confirmed by the decline in the receipts per ton mile (7.41 mills) not only from 1911 but below 1901 or any figure in the column. The final returns will probably raise the average to about 7.45 mills.

This decline affords an illustration of the serious effects of anything reducing freight rates, however slightly. A decline of sixteen one thousandths of a cent per ton mile would not strike the casual reader as a matter of great consequence, but when applied to 261,416,643,000 ton miles, as it was in this instance, it deprived the railways of nearly \$42,000,000 in freight earnings. Even one

thousandth of a cent on freight ton mileage mounts into the millions in revenues.

FREIGHT TRAFFIC SINCE 1888.

The next summary passes in review all the salient facts concerning the freight traffic since 1888, when the Interstate Commerce Commission began compiling statistics:

SUMMARY OF TONS CARRIED, TON MILEAGE, MILEAGE OF FREIGHT TRAINS, AVERAGE TONS IN TRAINS, FREIGHT REVENUES AND AVERAGE RECEIPTS PER TON MILE, 1912 TO 1888.

Year	Tons Carried (Millions)	Tons Carried One Mile (Millions)	Mileage Freight Trains (Millions)	Average Tons in Train	Average Haul per Ton (Miles)	Freight Revenue (Millions)	Receipts per Ton-Mile (Cents)
1912 (a).....	1,766	261,416	605	430	148	1,936	7.41
1911 (b).....	1,781	253,783	.....	383	141	1,925	7.57
1910 (b).....	1,849	255,016	635	380	138	1,925	.753
1909 (b).....	1,556	218,802	568	363	142	1,677	.763
1908 (b).....	1,532	218,381	587	352	144	1,655	.754
1907.....	1,796	236,601	629	357	132	1,823	.759
1906.....	1,631	215,877	594	344	132	1,646	.748
1905.....	1,427	186,463	546	322	130	1,450	.766
1904.....	1,309	174,522	535	307	133	1,379	.780
1903.....	1,304	173,221	526	310	132	1,333	.763
1902.....	1,200	157,289	499	296	131	1,207	.757
1901.....	1,089	147,077	491	281	135	1,118	.750
1900.....	1,081	141,596	492	270	130	1,049	.729
1899.....	943	123,667	(c) 507	243	131	913	.724
1898.....	863	114,077	503	226	132	876	.753
1897.....	728	95,139	464	204	130	772	.798
1896.....	765	95,328	479	198	124	786	.806
1895.....	696	85,227	449	189	122	729	.839
1894.....	638	80,335	446	179	125	699	.860
1893.....	745	93,588	508	183	125	829	.878
1892.....	706	88,241	485	181	124	799	.898
1891.....	675	81,073	446	181	120	736	.895
1890.....	636	76,207	435	175	119	714	.941
1889.....	539	68,727	383	179	127	644	.922
1888.....	480	61,329	348	176	128	613	1.001
Increase 1888 to 1912	268%	326%	74%	144%	15%	216%	D25.9%

(a) Bureau figures, 236,444 miles represented.

(b) Excludes figures of switching and terminal companies.

(c) Includes 75% of mixed train mileage, that being the practice prior to 1900.

D Decrease.

The table establishes the ascendancy of American railways over all modern means of transportation. Water competition, which was relegated to the days beyond the deluge on this continent as early as 1872, has no hope of revival against the agency which reaches everywhere and carries 261,416,643,000 tons of miscellaneous commodities one mile at the average rate of 7.41 mills. Mark the average per ton mile receipts at their highest point in this table and

compare them with those under government ownership in Germany given below.

The splendid record of transportation efficiency and cheapness shown in the above table has been achieved by American initiative and methods that are outside the pale of bureaucratic imagination or even imitation. They have been accomplished on what has been practically stationary per mile capitalization. But the day of such achievement and self-expansion without millions of fresh capital has passed.

TON MILE RATES IN FOREIGN COUNTRIES.

In the following table the average receipts per ton mile has been compiled from the latest returns available for the countries named:

	Receipts per Ton-Mile Cents		Receipts per Ton-Mile Cents
United Kingdom (1911)	2.33	Sweden (1908)	2.23
Germany (1910)	1.41	Norway (1910)	1.68
France (1909)	1.39	Denmark (1910)	2.16
Russia (1908) .....	.95	Holland (1910)	1.32
Austria (1910)	1.45	Belgium (1910) (a) .....	.74
Hungary (1910)	1.31	Switzerland (1910)	2.91

(a) Figures for Belgium apply to carload lots only.

No recent ton mile figures for Italy are available, but the average receipts have been estimated in the vicinity of 2 cents.

The British rate given in this table is the average of the North Eastern Railway the only English road that has adopted the ton mile unit. In 1911 it carried 31,653,944 tons an average of 23.13 miles. Of the North Eastern's freight 74% was minerals against 55% for the United States.

The average receipts per ton and per ton mile in Germany for the last fifteen years were as follows:

RECEIPTS PER TON AND TON MILE ON GERMAN RAILWAYS SINCE 1886.

	Per Ton	Per Ton-Mile		Per Ton	Per Ton-Mile
1910	\$0.85	.....	1902	\$0.88	.0143
1909	0.86	.0141	1901	0.89	.0143
1908	0.87	.0141	1900	0.90	.0142
1907	0.86	.0140	1899	0.90	.0143
1906	0.87	.0141	1898	0.91	.0145
1905	0.87	.0142	1896	0.95	.0151
1904	0.89	.0142	1891	0.95	.0149
1903	0.88	.0142	1886	1.05	.0156
1902	0.88	.0143			

Throughout the period covered by this table the average freight haul in Germany has scarcely varied from slightly under 100 kilometers. Where figures are not given since 1886 official data was not available.

Where a ton of freight was carried 62 miles in Germany in 1910 for an average of 85 cents, a ton of freight was carried 138 miles in the United States for an average of \$1.03. If the freight had to be paid by a German railway employe it cost him three-quarters of a day's work to pay for it, where the average American employe could pay for moving two and a half tons double the distance for one day's pay.

That comparison marks the true difference between freight rates in Germany and the United States.

PROPORTION OF COMMODITIES MOVED.

The next statement classifies the tonnage moved by commodities for the years 1912 and 1911.

SUMMARY OF TONNAGE AND PROPORTION OF DIFFERENT CLASSES OF COMMODITIES MOVED, 1911 AND 1912.

Class of Commodity	1911		1912	
	Tonnage Reported as Originating on Line	Per Cent of Aggregate	Tonnage Reported as Originating on Line	Per Cent of Aggregate
Products of Agriculture.....	87,597,156	9.29	99,291,518	9.89
" " Animals.....	23,346,893	2.47	27,300,895	2.72
" " Mines.....	518,634,064	55.03	560,005,036	55.81
" " Forests.....	101,541,905	10.77	97,526,945	9.73
Manufactures.....	136,495,890	14.48	143,758,324	14.32
Merchandise.....	39,017,110	4.14	42,467,790	4.23
Miscellaneous.....	35,955,756	3.82	33,001,548	3.30
Total.....	942,588,774	100.00	1,003,352,056	100.00

The next statement gives the proportions of the respective commodities as arrived at in the preceding table for the years 1901 to 1912 divided into low and high rate commodities.

SUMMARY SHOWING PERCENTAGE OF FREIGHT TRAFFIC MOVEMENT
BY CLASSES OF COMMODITIES, 1901 TO 1912.

Year	Low Rate Freight Percentage of Aggregate					High Rate Freight Percentage of Aggregate			
	Prod- ucts of Agri- culture	Ani- mals	Mines	Forest	Total	Manu- factures	Mer- chan- dise	Miscel- laneous	Total
1901 Official.....	10.76	2.91	51.67	11.67	77.01	13.75	4.16	5.08	22.99
1902 "	9.23	2.64	52.36	11.64	75.87	14.49	4.37	5.27	24.13
1903 "	9.56	2.63	51.56	11.67	75.42	14.39	4.69	5.50	24.58
1904 "	9.59	2.74	51.56	12.53	76.42	13.41	4.83	5.34	23.53
1905 "	9.03	2.54	53.59	11.24	76.40	13.60	4.32	5.68	23.60
1906 "	8.56	2.32	53.09	11.24	75.21	14.81	4.06	5.92	24.79
1907 "	8.62	2.29	53.39	11.38	75.68	15.41	3.89	5.02	24.32
1908 "	8.74	2.46	55.72	11.35	78.27	13.15	4.04	4.54	21.73
1909 "	8.92	2.49	55.60	11.75	78.76	13.15	4.11	3.98	21.24
1910 "	8.13	2.10	56.23	11.67	78.13	14.42	3.69	3.76	21.87
1911 (Bureau).....	9.29	2.47	55.03	10.77	77.56	14.48	4.14	3.82	22.44
1911 "	9.89	2.72	55.81	9.73	78.15	14.32	4.23	3.30	21.85

TON MILEAGE DATA ON SELECTED COMMODITIES.

The next statement presents data specially reported to the Commission covering ton mile statistics and revenues for eight selected commodities for the year 1910:

SUMMARY OF SELECTED COMMODITIES FOR THE YEAR ENDING JUNE
30, 1910—130,395 MILES REPRESENTED.

Commodity	Freight Carried in Carload Lots	Ton-Mileage of Freight Carried in Carload Lots	Revenue from Freight Carried in Carload Lots	1910 Average Receipts per Ton per Mile from Same Cents	1909 Average Receipts per Ton per Mile from Same Cents
Grain.....	31,947,009	7,067,690,568	\$44,553,330	0.630	0.611
Hay.....	5,856,185	954,623,830	9,731,590	1.019	1.025
Cotton.....	3,400,316	689,594,719	12,573,674	1.823	1.781
Live Stock.....	10,754,103	2,449,310,036	29,802,514	1.217	1.166
Dressed Meats.....	2,407,454	724,239,606	6,548,955	.904	.905
Anthracite Coal.....	28,202,577	5,104,428,347	30,083,630	.589	.603
Bituminous Coal.....	192,479,389	22,223,778,428	110,139,107	.495	.512
Lumber.....	68,482,732	11,891,569,514	87,225,470	.734	.770

As these figures cover less than 54% of the railway mileage of the United States, they are in no way comparable with the summaries for the country at large.

RATES IN NEW SOUTH WALES.

However, it may be of some interest to compare the rates in the foregoing table on grain, hay, live stock and coal with the rates on similar commodities in New South Wales, the Australian colony which furnishes comprehensive data on the subject:'

STATEMENT OF AVERAGE HAUL AND TON MILE RECEIPTS ON THE GOVERNMENT RAILWAYS OF NEW SOUTH WALES FOR YEARS ENDING JUNE 30, 1911, AND 1912.

Commodity	1911		1912	
	Average Haul Miles	Receipts per Ton Mile (Cents)	Average Haul Miles	Receipts per Ton Mile (Cents)
Coal and Shale.....	29.01	.94	27.02	.96
Firewood.....	26.64	1.60	30.16	1.50
Grain and Flour.....	262.58	.70	259.30	.70
Hay, Straw and Chaff.....	263.81	.76	217.13	.74
Wool.....	296.68	3.98	302.11	3.84
Live Stock.....	256.99	2.34	262.06	2.12
General Merchandise (including all other Goods).....	91.83	3.04	93.78	2.90
Total.....	80.65	1.82	81.08	1.78

According to an official note, "The above earnings are exclusive of terminal charges." In 1912 the receipts from freight amounted to £3,715,707 or £533,936 more than was charged for in the ton mileage account. Had this been included in the computation the average receipts per ton mile for 1912 would have been 2.07 cents against 2.12 cents as the result of like inclusion in 1911.

VIII

EARNINGS AND EXPENSES

Following the practice of the Commission before its statistics were turned topsy-turvy by the innovations of 1908 and in natural sequence to the facts contained in the chapter showing the "public service" performed by the railways, this chapter deals with their revenues, expenses, and the disposition of their income.

As the entire theory and purpose of railway regulation is to secure adequate and efficient transportation it is considered best to confine the statistics as nearly as possible to what the railways receive for transporting persons, freight, mail and express matter on the one hand and what they pay out in working expenses, taxes and return on capital invested in the industry on the other hand. Any publication of statistics that goes beyond this perverts the purpose of publicity and muddies the stream of popular thought with false and misleading information.

To prevent this all complications arising from intercorporate relations—the interownership of stocks and bonds of and by railway companies, so far as may be, are sought to be avoided by confining the figures to roads which actually render public service. It is the public service that counts and not the transfer of interest, dividends and rentals back and forth between operating and non-operating companies.

With this explanation the first statement under this title presents the income account of the railways of the United States for the years 1911 and 1912, considered as a system:

COMPARATIVE INCOME ACCOUNT OF THE RAILWAYS IN THE UNITED STATES, CONSIDERED AS A SYSTEM, FOR THE YEARS ENDING JUNE 30, 1912 AND 1911.

Item	Amount	
	1912 Bureau's Figures	1911 Official Figures (a)
Miles Represented.....	236,444	246,124
Operating Revenue:		
From Passengers.....	\$ 653,598,401	\$ 657,638,291
From Freight.....	1,936,237,488	1,925,950,887
From Mail.....	50,458,769	50,702,625
From Express.....	73,053,799	70,725,137
Other Revenue from Operation.....	92,828,737	84,744,729
Total Revenues from Operation....	\$2,806,177,194	\$2,789,761,669
Operating Expenses:		
Maintenance of Way and Structures..	\$ 360,446,190	\$ 366,025,262
Maintenance of Equipment.....	446,446,230	428,367,306
Traffic Expenses.....	59,895,212	59,166,364
Transportation Expenses.....	1,008,019,735	987,382,108
General Expenses.....	71,684,564	74,112,965
Taxes (b).....	118,153,819	108,309,512
Total Expenses and Taxes.....	2,064,645,750	2,023,363,517
Net Revenues from Operation	741,531,444	766,398,152
Net Revenue from Outside Operations..	4,854,257	1,815,193
Total Operating Income.....	\$ 746,385,701	\$ 768,213,345
Disposition:		
Interest on Funded Debt.....	\$ 359,057,426	.....
Interest on Current Liabilities.....	17,832,412	.....
Rent paid for lease of road (b).....	124,371,551	.....
Additions and Betterments Charged to Income.....	37,510,410	.....
To Other Reserves.....	6,783,893	.....
Deficits of Weak Lines.....	32,986,563	.....
Other Deductions.....	32,120,859	.....
Total Deductions.....	610,663,114	(c)585,984,170
Income Available for Dividends and Surplus.....	\$ 135,722,587	\$ 182,229,175

(a) Does not include returns for switching and terminal companies.

(b) Includes both for 1912 and 1911, the sum of \$5,652,355, paid by leased roads out of rentals, a like amount being deducted from "Rent paid for lease of road" both years.

(c) Details for "Total Deductions" in 1911 not available.

The above table presents the income account of the railways of the United States for the years 1911 and 1912 stripped of confusing extraneous duplications. It is confined as nearly as may be to the revenues and expenses of the railways as common carriers. The item of "interest on funded debt" may be swelled by several millions which might be transferred to the balance available for divi-

dends. But in 1910 the Commission spoke of \$370,092,222 as "net interest on funded debt" that year.

In the "Abstract of statistics of railways in the United States for the year ended June 30, 1911," prepared and issued by the Commission "For the Press," no feature was seized on with more avidity by the newspapers than the sentence reading:

"The amount of dividends declared during the year (by both operating and lessor companies) was \$460,195,376, being equivalent to 8.03% on dividend paying stock."

Of course in the mutations of publication the qualifying phrases were cut out and the statement went broadcast that the railways had paid \$460,195,376 dividends or 8.03% on their stock. The enormous total and the high per cent. in what was known as a lean railway year stuck in the public crop and remains there to this day. On the stump and in the schools and colleges these fabulous figures have been received as true and meaning what the Commission did not say.

It mattered naught that the so-called "Abstract" contained a table which among other things showed that the "operating income" of the operating roads was swelled by adding thereto \$308,881,892 "other income."

If the reader will deduct this \$308,881,892, which mostly came to the operating roads in the form of interest and dividends on intercorporate investments and so was duplication pure and simple, if he will deduct it from the \$460,195,376 dividends reported declared, and to the remainder of \$151,213,484 add \$36,112,797 dividends declared by leased roads out of current rentals, he will get \$187,326,281, which is very close to the total dividends paid by operating roads out of transportation revenues from the rates and fares collected from the public.

Even this sum is larger than the amount shown available in the above table for "dividends and surplus." But in 1911 the operating roads received over \$30,000,000 interest on funded debt owned, which could have been applied on the interest paid by them. This would have released just that much more for dividends and surplus.

With this adjustment it is clear that the railways in 1911 did not have over \$212,000,000 available for dividends and surplus, let alone \$460,195,376.

THE DIVIDENDS IN 1912.

According to the returns to this Bureau the 386 companies reporting to it covering 97.75% of the railway traffic of the United States

declared dividends to the amount of \$246,621,701 divided as follows:	
Common stock.....	\$209,112,032
Preferred stock.....	37,503,429
Debenture stock.....	6,240

Total declared.....\$246,621,701

This was equivalent to $3\frac{1}{2}\%$ on the \$7,016,703,076 capital stock of these companies which operated 236,444 miles of line. Some of the companies declared dividends of 6, 7 and more per cent. Some of them had no balance on the credit side out of which to declare any dividends at all. But all were entitled to some return on the capital irrevocably invested in a great public utility.

There are scores of railways in the United States which have never paid a dividend to their owners, which owing to some circumstance of location competition or other condition have difficulty in meeting their fixed charges, which are yet the indispensable highways for vast territories and millions of people. Living rates are impossible to these roads and yet they must live. Lower rates mean bankruptcy or inferior service. These are the roads that suffer most from higher wages and the high cost of railway living. They cannot be disregarded in the average of dividends.

But where did the 386 companies referred to above get the funds with which to declare \$246,621,701 in dividends since their income account showed only \$135,722,587 "available for dividends and surplus"?

The difference between what they had and what they declared did not come from transportation revenues but from "other income" which they received to the amount of \$257,121,010.

It will be remembered that these 386 companies owned \$3,136,-345,433 railway stocks, \$1,901,097,051 railway funded debt and \$1,031,251,117 miscellaneous securities. Well it was from this total of \$6,068,693,601 securities, mostly intercorporate, that the 386 operating companies received the \$257,121,010 that made it possible for them to pay the dividends declared.

So far as railway capital was a charge on the transportation industry it is represented in the four items in the first table under this title, viz:

Interest on funded debt.....	\$359,057,426
Interest on current liabilities.....	17,832,412
Rent paid for lease of road.....	124,371,551
Income available for dividends and surplus.....	135,722,587
Total capital charge.....	\$636,983,976

This the reader need scarcely be told is only 4.24% on \$15,000,000,000, the accepted net capitalization of the railways, or only 3.15% on \$20,000,000,000 which Senator Cummins acknowledged four years ago was their probable value.

WHAT BECOMES OF THE ITEM OF RENT.

From the following official summary of the disposal of the rent paid by the operating roads in 1911, the probable disposition of the \$130,023,906 (including taxes) paid for the leased roads in 1912 may be approximately allocated:

CONDENSED INCOME ACCOUNT AND PROFIT AND LOSS ACCOUNT OF LEASED ROADS FOR THE YEAR ENDING JUNE 30, 1911.

Gross Income from Lease of Road.....	\$120,773,004	
Salaries and Maintenance of Organization.....	418,987	
Taxes Accrued.....	5,652,335	
Net Income from Lease of Road.....		\$114,701,662
Other Income.....		4,464,549
Gross Corporate Income.....		119,166,211
Deductions from Gross Corporate Income.....		62,996,507
Net Corporate Income.....		56,169,704
Disposition of Net Corporate Income:		
Dividends Declared from Current Income.....	\$36,112,797	
Appropriations for Additions and Betterments and for New Lines or Extensions.....	1,927,422	
Appropriations for Other Reserves.....	8,000	
Total.....		38,048,219
Balance to Credit of Profit and Loss.....		\$18,121,485

PROFIT AND LOSS ACCOUNT.

Credit Balance on June 30, 1909 (a).....		\$72,567,921
Credit Balance for Year 1910 from Income Account.....		18,121,485
Total.....		\$90,689,406
Dividends Declared out of Surplus.....		20,559,380
Difference.....		\$70,130,026
Other Profit and Loss Items—Debit Balance.....		1,483,530
Balance Credit June 30, 1910, Carried to Balance Sheet.....		68,646,496

(a) This balance in the report for 1909 was given as \$71,828,321.

The principal amount included under the blind item "Deductions from Gross Corporate Income" in 1910 was \$49,640,657 for interest on funded debt, which would appear to be a moderate interest charge on nearly 40,000 miles of main line.

DISTRIBUTION OF TRANSPORTATION REVENUES.

The next statement shows how the gross earnings (\$2,806,177,-194) of the railways reporting to this Bureau in 1912 were distributed in greater detail than appears in the income account, in comparison with a similar division of earnings for 1910 and 1909.

SUMMARY SHOWING THE DISTRIBUTION OF GROSS EARNINGS OF 236,444 MILES OF OPERATED LINE IN 1912, COMPARED WITH THE PERCENTAGES FOR 1911 AND 1907.

Item	Gross Earnings			
	1912.....	\$2,806,177,194	1910.....	2,750,667,435
	1907.....	2,589,105,578		
	Amount 1912	Per Cent of Gross Earnings		
		1912	1910	1907
Operating Expenses:				
Maintenance of Way and Structures..	\$360,446,190	12.84	13.40	13.27
Maintenance of Equipment.....	446,446,230	15.91	15.02	14.22
Traffic Expenses.....	59,895,212	2.14	2.04	.....
Transportation Expenses.....	1,008,019,735	35.92	33.34	37.50
General Expenses.....	71,684,564	25.5	2.49	2.54
Total.....	\$1,946,645,750	69.36	66.29	67.53
Disposition of Same:				
Pay of Employees.....	\$1,239,425,284	44.17	41.58	41.42
Fuel for Locomotives.....	230,555,544	8.21	7.92	7.74
Oil and Water for Locomotives.....	20,204,574	.72	.68	.88
Loss and Damage.....	61,838,136	2.20	1.99	1.83
Material for Way and Structures.....	394,468,393	14.06	14.12	15.66
Supplies and Expenses.....				
Stationery and Printing.....				
Law Expenses.....				
Advertising.....				
Insurance.....	394,468,393	14.06	14.12	15.66
Miscellaneous, including Hire and Rent of Equipment, etc.....				
Total Expenses.....	\$1,946,491,931	69.36	66.29	67.53
Taxes (a).....	118,153,819	4.21	3.77	3.10
Rentals of Leased Roads.....	124,371,551	4.41	4.56	4.69
Interest on Funded Debt and Current Liabilities.....	376,889,838	13.43	13.17	13.14
Dividends and Surplus.....	135,722,587	4.84	7.91	8.78
Deficit of Weak Companies.....	32,986,563	1.18	.67	.19
Betterments and Reserves.....	44,294,303	1.58	2.10	1.50
Other Deductions.....	32,120,859	1.16	1.53	1.07
Total.....	\$2,811,031,451	100.17	100.00	100.00
Deduct Net Outside Operation.....	4,854,257	.17		
Gross Operating Revenues.....	\$2,806,177,194	100.00		

(a) Includes taxes for leased roads deducted from rent.

It will be observed that the item of \$4,854,257 net revenue from outside operation cannot properly be allocated among any of the items of revenue producing expenses, but when divided along with the income after paying expenses it produces an excess of .17%.

DIFFICULTY OF SEPARATING LABOR AND MATERIAL.

With all the multiplication of detail in the classification of expenditures required of the railways no practical method has been prescribed for separating the amounts expended for labor, material equipment, supplies and other expenses.

In the division of maintenance of way and structures it is known that 70% of the cost goes to labor, but it is left to conjecture whether the cost of such an item as material for "bridges, trestles and culverts" is included under "other track material" or not.

Although incomplete, the returns to this Bureau show that the following percentages of the cost of the several divisions were paid to employes in 1912:

	Paid to Employes.
Maintenance of way and structures.....	68.6%
Maintenance of equipment.....	63.0%
Traffic expenses	46.3%
Transportation expenses	59.7%
General expenses	75.2%

Payments on account of labor, fuel (which is 70% labor), and damages and injuries, which produce no revenue, combined, absorbed nearly 90% of what the railways pay under the head of transportation expenses.

IX

TAXES

The 386 railway companies reporting to the Bureau and owning 196,831 miles of the 236,444 they operated paid \$112,501,464 in taxes for the year 1912. To this has been added a sum equal to the \$5,652,355 paid by their lessor companies out of rentals in 1911, making a total of \$118,153,819, or nearly \$500 a mile.

Does the reader know what \$500 taxes per mile means?

It is the state's testimony that the private property of the railways of the United States irrevocably devoted to public use are officially valued at nearly \$70,000 per mile.

In the volume of census reports devoted to the "Wealth, Debt and Taxation," issued in 1907, the director of the census found that "the tax rate per \$100 of estimated true value" of all property in the United States "was 74 cents in 1902." This was a liberal estimate at the time it was made, as the census figures for 1904 showed that the "estimated true value" for 1902 was too low and there was no mistake about the taxes paid.

Every tax-payer can figure for himself on honor, in the confidences between putting out the light and sleep, whether his tax bill in 1912 amounted to 74 cents per \$100 of his actual property. The unfortunate few may pay a higher tax rate, but the thrifty many pay very much less in proportion to their wealth or poverty.

There is another angle to bring this matter of railway taxation home to the individual. In this nation of approximately 37,000,000 breadwinners, averaging, say, \$500 income per year, how many, think you, pay \$65 per annum direct taxes into the common fund that provides all the protection and services of government for all? And yet \$65 is only 13% on \$500 and the railways paid 13.74% of their income from transportation in taxes.

A great many people and even professional economists think the government would get rid of the expense of carrying the mails if it owned the railways. If the railways could get rid of paying taxes, as the government would, they could afford to carry the mails for nothing. In 1912 the railways received only \$50,458,769 for their mail service, against the \$118,153,819 they paid in taxes.

When, if ever, the government assumes the operation of the railways, it will find that carrying the mails will cost double what it is paying now, and the states and municipalities will have to look else-

where than to the railways for a large share of their operating revenues.

The following statement presents a review of the taxes paid by the railways of the United States during the past twenty-four years:

SUMMARY OF TAXES PAID BY THE RAILWAYS OF THE UNITED STATES
SINCE 1889, ANNUALLY PER MILE AND RELATIVELY.

Year	Taxes Paid	Per Mile	Percentage of Earnings
1912 (Bureau Figures).....	\$118,153,819	\$499	4.21
1911 (Official Figures).....	103,309,512	442	3.88
1910*.....	103,795,701	431	3.77
1909*.....	90,529,014	384	3.74
1908*.....	84,555,146	367	3.53
1907.....	80,312,375	353	3.10
1906.....	74,785,615	336	3.21
1905.....	63,474,679	292	3.04
1904.....	61,696,354	290	3.12
1903.....	57,849,569	281	3.04
1902.....	54,465,437	272	3.15
1901.....	50,944,372	260	3.20
1900.....	48,332,273	250	3.24
1899.....	46,337,632	247	3.53
1898.....	43,828,224	237	3.51
1897.....	43,137,844	235	3.84
1896.....	39,970,791	219	3.48
1895.....	39,832,433	224	3.70
1894.....	38,125,274	211	3.56
1893.....	36,514,639	215	2.99
1892.....	34,053,495	209	2.90
1891.....	33,280,095	206	3.04
1890.....	31,207,469	199	2.96
1889.....	27,590,394	179	2.86
Aggregate Taxes 24 Years.....	\$1,411,082,206		
Percentage of Increase.....	328%	178%	47%

*Does not include switching and terminal companies.

No other industry in the United States can show such an ascending scale of taxation as is here presented. It is a testimonial to the growth of the railways and the ceaseless ingenuity of the taxing bodies, who, when one form of taxing, percentage or *ad valorem*, failed to meet expectations, shifted to the other.

It has not been considered expedient to give the percentage of taxes to net earnings because the question arises whether it should be applied to the balance of revenues before or after deducting the taxes. In one case, the percentage for 1912 would have been 13.74, in the other, 15.92.

During the last twenty-four years the net capitalization of the railways has increased only 20% per mile, whereas, as the above table demonstrates, their taxes have increased 178% per mile. Whole volumes could not say more.

X

DAMAGES AND INJURIES TO PERSONS

Among the unremunerative expenditures which the railways appear powerless to restrict and which legislation tends to encourage are the payments on account of injuries to persons and loss and damage of property. It was hoped that the upward trend of these items in 1911 was sporadic in its character, but the returns for 1912 indicate that it was indicative of a permanent tendency, as evidenced in the following statement comparing the returns to this Bureau with those to the Commission in 1910:

SUMMARY OF PAYMENTS ON ACCOUNT OF INJURIES TO PERSONS AND LOSS AND DAMAGE DURING THE YEARS 1910 AND 1912.

Account	Amount 1910 (Official)	Amount 1912 (Bureau)	Per Cent of Earnings	
			1910	1912
Injuries to Persons:				
Maintenance of Way.....	\$ 1,887,261	\$ 2,034,485		
Maintenance of Equipment.....	1,375,924	1,844,039		
Transportation.....	20,020,960	23,762,327		
Total.....	\$23,284,145	\$27,640,851	.86	.98
Loss and Damage:				
To Freight.....	21,852,391	24,953,843		
To Baggage.....	370,323	304,925		
To Property.....	4,808,993	4,846,165		
To Live Stock, etc.....	3,675,968	4,092,352		
Total, Loss and Damage.....	\$30,707,675	\$34,197,285	1.13	1.22
Grand Total.....	\$53,991,820	\$61,838,136	1.99	2.20

The total for the two accounts in 1912 showed an increase of \$1,879,643 over the like items for practically the same roads in 1911, amounting to over 3%.

It is too early to judge of the effects of the various Compensation and Employers' Liability laws in progress of incubation in almost every state in the Union. It is known, however, that they have no intention of protecting the railways from dubious claims or they would have no chance of becoming laws.

The next table shows how the loss and damage tax on railway revenues has grown out of all proportion to the increase in traffic since 1899:

PAYMENTS ON ACCOUNT OF "LOSS AND DAMAGE" AND "INJURIES TO PERSONS" 1899 TO 1912 AND PROPORTION TO GROSS EARNINGS.

Year	Loss and Damage		Injuries to Persons	
	Amount	Per Cent of Earnings	Amount	Per Cent of Earnings
1899.....	\$ 5,976,082	.455	\$ 7,116,212	.541
1900.....	7,055,622	.474	8,405,980	.565
1901.....	8,109,637	.510	9,014,144	.567
1902.....	11,034,686	.639	11,682,756	.676
1903.....	13,726,508	.722	14,052,123	.739
1904.....	17,002,602	.861	15,833,179	.802
1905.....	19,782,692	.946	16,034,727	.770
1906.....	21,086,219	.907	17,466,864	.751
1907.....	25,796,083	.996	21,462,504	.829
1908.....	34,631,243	1.447	20,088,543	.839
1909.....	32,922,986	1.386	23,456,038	.988
1910.....	30,707,675	1.134	23,284,145	.859
1911.....	33,978,746	1.238	25,979,747	.946
1912.....	34,197,285	1.220	27,640,851	.985
Increase in 13 Years, per cent...	472%	168%	288%	82%

Here is a drain on railway revenues which would practically cease under government management since the government can do no wrong. It finds no exact counterpart in the statistics of government railways abroad. In Germany the total payment on account of laws relating to indemnities and accident insurance amounted to less than \$5,000,000, and the employes contribute to the funds out of which this was paid.

The figures for payment by British roads on these two accounts for the calendar year 1911 were as follows:

Compensation to Employes.....	\$1,427,362
Compensation for Personal Injuries to Passengers.....	665,094
Compensation for Damage to or Loss of Goods.....	2,138,037
Total.....	\$4,230,493
Proportion to Earnings.....	0.74%

In the twelve years 1899 to 1911 the payment of British roads on these three accounts increased only 24% against an increase of over 372% for the United States.

XI

LOCOMOTIVE FUEL

Returns to the Bureau show that during the year ending June 30, 1912, the 386 roads reporting to it paid \$230,555,544 for locomotive fuel, being an increase of \$3,650,788 over 1911. The increase was proportionately greater in the cost for yard locomotives, \$31,880,033, than for road locomotives, \$198,675,511.

Against an increase of 1.6% in the cost of fuel in 1912 over the preceding year there was practically no increase in train mileage, but nearly 3% in car mileage and over 4% in freight ton mileage. These figures reflect the increased power of the locomotives, a locomotive mile in 1912 standing for almost 3% more than it did in 1910. Few persons even in railway circles when speaking of locomotive miles realize that a locomotive mile today means fully 40% more than it did in 1902.

That the expenditures of the railways for fuel in 1912 were the largest in their history appears from the following statement covering the years 1899 to 1912:

SUMMARY OF COST OF LOCOMOTIVE FUEL AND PROPORTION TO EARNINGS AND EXPENSES OF AMERICAN RAILWAYS, 1912 TO 1899, WITH PRICE OF BITUMINOUS COAL PER TON DURING THE SAME PERIOD.

Year	Miles of Line	Cost of Locomotive Fuel	Proportion to Operating Expenses	Proportion to Gross Earnings	Price of Coal at Mines per Ton*
1912 Bureau Figures.....	236,444	\$230,555,544	11.85	8.22	.....
1911 " "	232,117	226,904,756	12.037	8.26	.....
1910 Official.....	240,830	217,780,953	11.953	7.92	1.12
1909 "	235,402	188,735,868	11.804	7.81	1.07
1908 "	230,494	201,905,054	12.097	8.44	1.12
1907 "	227,454	200,261,975	11.471	7.74	1.14
1906 "	222,340	170,499,133	11.119	7.34	1.11
1905 "	216,973	156,429,245	11.278	7.51	1.06
1904 "	212,243	158,948,886	11.893	8.05	1.10
1903 "	205,313	146,509,031	11.675	7.70	1.24
1902 "	200,154	120,074,192	10.776	6.96	1.12
1901 "	195,561	104,926,568	10.602	6.61	1.05
1900 "	192,556	90,593,965	9.809	6.09	1.04
1899 "	187,534	77,187,344	9.478	5.88	.87

*These figures are from the latest report of the United States Geological Survey.

The latest reports on the wholesale price of coal indicate that the railways paid about the same per ton during 1911 and 1912 as in 1910, with variations according to locality of supply.

XII

ACCIDENTS

"Nowhere in the world have appliances for safeguarding railway transportation been so highly developed as in this country."—BLOCK SIGNAL AND TRAIN CONTROL BOARD.

In the discussion of accidents on American railways nothing is so discouraging as the popular disposition to apply the wrong remedy as far from the seat of the real trouble as possible.

In a sane analysis of railway casualties it is quickly apparent that *less than one-twelfth* are in any way due to causes that can be remedied by mechanical appliances for the protection of trains. The other eleven-twelfths result from causes common to all conditions and occupations under the sun. In Canada accidents to agriculturists take precedence, in the United Kingdom those who go down to the sea in ships are the most numerous victims. In the streets of the United Kingdom in 1910 there were 1,327 fatal accidents caused by vehicles, of which mechanically propelled vehicles claimed 672 and horse drawn vehicles 655—an almost equal division.

ACCIDENTS AND THE UNITS OF RISK.

Happily, the number of fatalities charged to American railways does not grow with the increase in the units of risk. Between 1902 and 1912 the passenger and freight traffic in the United States increased over 66%, whereas the fatalities to passengers in all kinds of railway accidents actually decreased from 345 to 318, and those to employes increased only 29%, where the number of employes increased from 1,189,315 in 1902 to 1,729,144 in 1912, or 45%.

Such figures should forever dissipate the popular impression that accidents are increasing disproportionately on American railways; and they would, did not the headlines in sensational periodicals grow blacker as the occasion for using them on railway casualties are less frequent.

There remains with us, however, like the poor, the invidious comparison with English and European alleged immunity from railway accidents. It matters naught that no such immunity exists, or ever will exist. Moreover, the contrast in accidents is no greater, if as great, than the contrast in units of risk. These units consist primarily in miles of track that have to be constantly guarded and inspected and of the number of passengers and tons of freight, with

the distance carried. These units for Europe and the United States, according to the latest data, were as follows:

	All Europe 1910	United States 1912
Miles of Line.....	206,987	248,888
Passengers Carried One Mile.....	73,555,578,571	32,820,623,000
Freight Tons Carried One Mile.....	117,360,167,100	261,416,643,000

If the passenger traffic could be considered alone the units of risk would be more than two to one against European travel. But the passenger service in the United States includes a very heavy mail and express carriage, the latter included as freight in Europe. It is in its enormous freight traffic, however, that the excess of the units of risk lies. Here the proportion is far more than two to one against American railways, and, unlikely as it may seem to the superficial critic, the freight traffic is more important to human life than passenger traffic. Not only does the freight traffic pay the freight of American passenger traffic, but it is the common carrier of all the potentialities of life, comfort and prosperity on the continent.

The contrast in mileage, 206,987 to 248,888, does not begin to express the difference between European and American railway conditions. We have 120,000 miles of auxiliary tracks—a greater mileage than the main tracks of Germany, France, Austria-Hungary, Belgium and the United Kingdom combined. On every mile of this track accidents are possible. As the Public Service Commission of New York said recently, "Collisions are possible on almost every mile of railroad in the United States." If true of collisions, how immeasurably more true of all manner of accidents where humanity deals with the lurking dangers of weight and momentum—of frost, flood and tempest—inseparable from railway operation.

With the conditions as to units of risk briefly set forth above clearly in mind, the following statement compares the fatalities as last reported for the two countries:

	Europe 206,987 Miles Represented 1910	United States 248,888 Miles Represented 1912
Passengers Killed.....	554	318
Employes Killed.....	2,607	3,235
Other Persons Killed.....	4,465	(a) 6,632
Total.....	7,626	10,185

(a) Of these 5,434 were classed as trespassers.

Here our figures for passengers include 48 persons who should be classed as employes, reducing the total to 270 killed and the number of employes should be reduced by 315 killed while not on duty, such fatalities being classed among "other persons" and even as trespassers in European accident statistics.

With these corrections, it appears that only half as many passengers were killed in American railway accidents in 1912 as on European roads during the last twelve months reported, and less than 14% more employes, although our railway employes operated 20% more miles of road and 54% more units of traffic.

When we come to consider the fatalities to "other persons," the dark showing is not chargeable against American railway management, but presents an indictment of national lawlessness and recklessness. Throughout the republic railway right of way is properly dedicated to public use on which all persons are forbidden to trespass. The above note, "Of these, 5,434 were classed as trespassers," tells its own story of how more than half the railway fatalities in 1912 were victims of their own criminal recklessness. But it does not give the faintest idea of the uncounted thousands of lawbreakers who escaped. There is not an engineer of the 60,000 on American roads who has not more than one story to tell how every year he flashed by a joy walker or brought his engine to a dead stop within a few feet of a vagrant trespasser.

"LEARN TO OBEY."

Anything like the safety on American railways commensurate with the mechanical means provided to insure it, rests ultimately with the parents and the schools of the republic. Until obedience is inculcated into every generation that is pressing on, until "Learn to Obey" is the first lesson of childhood, it is useless to expect youths and adults to "Keep off the tracks," "Look out for the cars!" "Mind where you step!" "Railway property; keep out," etc. To the public, which has never learned to obey, such signs read almost like invitations to take a chance.

THE SAFETY OF AMERICAN RAILWAYS.

Happily there is another side to the statistics of American railway accidents that makes them better worth while than the mere enumeration of losses and fatalities. As gathered by the writer

for a period of nine years they unroll a reassuring record of immunity from fatalities. Twice in the history of British railways the Board of Trade was privileged to boast that a year had gone by without a single fatality to a passenger in a train accident. This was heralded around the world and hailed as proof of the phenomenal safety of British roads. Students of railway operation, however, know that such immunity from accidents was itself more of an accident that most of these recorded in less fortunate years.

Every year this accident of immunity from such fatalities befalls on more miles of American railway than there are miles in Germany, France, Austria and the United Kingdom, and 1912 was no exception as the ensuing statement shows:

SUMMARY OF MILEAGE AND TRAFFIC OF ROADS ON WHICH NO PASSENGER WAS KILLED IN A TRAIN ACCIDENT DURING THE YEARS 1912, 1911 AND 1909.

	1912	1911	1909
Number of Operating Companies.....	290	276	347
Mileage of These Companies.....	101,164	90,472	159,657
Passengers Carried.....	332,184,818	259,726,687	570,617,563
Passengers Carried 1 Mile.....	11,218,221,000	10,103,760,000	18,953,025,000
Tons of Freight Carried.....	867,909,428	759,745,370	1,116,877,052
Tons of Freight Carried 1 Mile.....	105,580,384,000	102,239,787,000	151,974,495,000
Passengers Killed in Train Accidents.....	None	None	None
Passengers Injured in Train Accidents.....	3,525	2,061	2,585

The roads included in this roll of honor for 1912 operated in every state in the Union. It includes roads whose mileage is greater than that of Belgium and the Netherlands combined and little roads with scarcely more than two trains each way per day. Much of this mileage is protected by the automatic or manual block system, but for the most part it consists of single track road where safety is attained through strict observance of rules by intelligent, vigilant and resourceful American railway employes.

WITHIN ONE OF PERFECT IMMUNITY.

Through misadventure rather than through any preventable cause there were 14 other roads that failed of complete immunity by a single fatality to a passenger in a train accident in 1912 as the following statement shows:

SUMMARY OF MILEAGE AND TRAFFIC OF ROADS ON WHICH ONLY
ONE PASSENGER WAS KILLED IN A TRAIN ACCIDENT DURING THE
YEARS 1912, 1911 AND 1909.

	1912	1911	1909
Number of Operating Companies.....	14	14	10
Mileage of These Companies.....	23,105	25,105	27,681
Passengers Carried.....	58,194,180	64,597,791	185,447,507
Passengers Carried 1 Mile.....	3,150,736,000	2,873,948,000	5,778,621,000
Tons of Freight Carried.....	116,381,967	135,054,793	213,086,612
Tons of Freight Carried 1 Mile.....	22,898,165,000	21,772,634,000	40,177,881,000
Passengers Killed in Train Accidents.....	14	14	10
Passengers Injured in Train Accidents.....	731	1,046	778

It should be explained that since 1909 the Bureau has had to rely on the voluntary courtesy of the railways reporting to it for the statistics of accidents making these statements of immunity possible. Since that year the Commission has ceased to require returns of accidents except in the monthly reports to which the Bureau has not access.

If the reports were as full as in 1909 the writer has little reason to doubt that the figures of perfect and near immunity for 1912 would surpass those then compiled.

NO FATALITIES IN NINE YEARS.

In its review of the accident on the Lackawanna at Corning, N. Y., on July 4 last the Public Service Commission of New York said: "This collision is the only one involving death of passengers which has occurred in over twelve years on the main line of the Lackawanna railroad under the daily operation of heavy traffic. Other railroads have also attained a high degree of safety. For instance, the Long Island Railroad, whose reports to this Commission show a yearly movement of 34,000 passenger trains, has not had an accident involving the death of a passenger in nineteen years." The Commission found that the Corning accident was clearly due to an engineman's "entire failure to observe signals."

The roads mentioned, although included in the list, are not the only ones with long records of complete immunity from fatalities in train accidents, as the following statement shows:

STATEMENT SHOWING NUMBER OF RAILWAYS AND MILEAGE ON WHICH NO PASSENGER HAS BEEN KILLED IN A TRAIN ACCIDENT, 1904 TO 1912.

Period	Number of Companies	Miles of Line Number Fatalities to Passengers in Train Accidents
Nine years, 1912-1904.....	8	4,379
Eight " 1912-1905.....	43	12,263
Seven " 1912-1906.....	76	16,492
Six " 1912-1907.....	90	17,419
Five " 1912-1908.....	118	25,528
Four " 1912-1909.....	145	37,791
Three " 1912-1910.....	165	40,976
Two " 1912-1911.....	209	56,351
One year 1912.....	290	101,164

In the face of such an exhibit of immunity as this what becomes of the invidious comparisons of American railway accidents with those on foreign roads. Here is seen a consecutive immunity for five years on a mileage greater than that of the British Isles, an immunity for six consecutive years on a mileage greater than that of Austria, and an immunity for four consecutive years greater than that of the German Empire.

Here, too, it should be remembered that the showing is not as impressive as it would have been but for the changes in the method of reporting railway accidents.

RAILWAY ACCIDENTS.

Through recent regulations and legislation the number of casualties charged to American railways has been almost doubled despite safer operation than ever known in their history. At the same time there has been a change in the published statistics of important collisions and derailments that robs them of any definite consecutive value. So far as the main features of the Accident Bulletins are concerned it has been greatly improved in form, but the reports of the investigations of accidents fail to give the impression of expert impartiality that has come to be expected in the reports of the British inspectors, from Colonel Yorke down.

In the following statement the Bureau has endeavored to adapt the Commission's new form of statistics to the necessity for consistent continuous uniformity:

SUMMARY OF CASUALTIES TO PERSONS IN RAILWAY ACCIDENTS FOR
THE YEARS ENDING JUNE 30, 1912 AND 1911.

	1912		1911	
	Killed	Injured	Killed	Injured
Passengers:				
Collisions.....	49	4,184	55	3,176
Derailments.....	65	3,956	39	2,374
Other Accidents to Trains.....		76		90
Other Causes.....	156	61,25	137	5,753
Total Passengers.....	270	14,291	281	11,393
Employes on Duty:				
Collisions.....	292	3,592	335	3,567
Derailments.....	251	3,015	258	2,258
Other Accidents to Trains.....	78	1,716	75	1,858
In Coupling Accidents.....	192	3,235	209	2,966
Overhead Obstructions.....	77	1,523	76	1,510
Falling from Cars.....	573	13,874	539	12,989
Other Causes.....	1,505	24,260	1,454	22,740
Total Employes.....	2,968	51,215	2,946	47,281
Total Passengers and Employes on Duty..	3,238	65,506	3,227	59,281
Employes not on Duty:				
In Train Accidents.....	20	156	13	174
In Coupling Accidents.....		2		
Overhead Obstructions.....	1	12	2	13
Falling from Cars.....	53	312	49	357
Other Causes.....	241	477	223	410
Total.....	315	959	292	954
Other Persons:				
Not Trespassing—				
In Train Accidents.....	13	277	11	175
Other Causes.....	1,185	4,746	1,143	4,893
Total.....	1,198	5,023	1,154	5,073
Trespassers:				
In Train Accidents.....	91	151	81	141
Other Causes.....	5,343	5,536	5,203	5,473
Total.....	5,434	5,687	5,284	5,614
Total Accidents Involving Train Operation.	10,185	77,175	9,957	70,922
Industrial Accidents to Employes:				
Not Involving Train Operation.....	400	92,363	439	79,237
Grand Total.....	10,585	169,538	10,396	150,159
1910.....	9,632	119,507		
1909.....	8,722	95,626		
1908.....	10,188	104,230		
1907.....	11,839	111,016		
1906.....	10,618	97,706		
1905.....	9,703	86,008		
1904.....	10,046	84,155		
1903.....	9,840	76,553		
1902.....	8,558	64,662		
1901.....	8,455	53,339		
1900.....	7,865	50,320		
1899.....	7,123	44,620		

This table has been carried back to 1899 in order to demonstrate the utter absurdity of the Commission's statistics regarding injuries.

An injury is something that defies statistical definition. What is an injury to one person may be treated as a joke by another. Death were better than some forms of injuries. Some result in permanent incapacity, others are entirely negligible. And yet all railway injuries may enter into the statistical corral to swell the popular mistrust of railways.

Mark how the tale of injuries in the above table took a sudden spurt of over 72% between 1899 and 1903, where the fatalities only increased 38%. This was the result of a change in the definition of an injury and also in the Commission's requirements in reporting all accidents.

Next compare the increase of 56% in injuries between 1903 and 1910 where there was an actual decrease in the total of fatalities.

This prepares the student for the extraordinary jump in the aggregate of injuries from 119,507 in 1910 to 169,538 in 1912, or 41% in two years where fatalities increased less than 10%.

Such vagaries as these justify the rejection of injuries as at present defined and compiled from the discussion of railway statistics, although to those receiving them and the companies who pay for them they remain of serious account.

It may be well for the searcher after truth to compare the totals of fatalities during the period of business activity in the above table with those for 1911 and 1912. They certify to a condition of increasing safety on American railways.

ONLY 347 KILLED IN COLLISIONS.

While public attention is chiefly directed to devices for the prevention of collisions the above table shows that only 49 passengers and 292 employes, including postal clerks, lost their lives in such accidents. To this total of 341 should be added six employes not on duty killed in collisions, making 347 victims of collisions out of a total of 10,585 fatalities charged to railway accidents. It is 347 too many, but in focusing public attention on the necessity for protecting trains from collisions, the more serious problem of preventing deaths from other causes (10,238 in 1912) should not be lost sight of. The railways have undertaken a campaign of education in watchfulness and carefulness among their employes which is already bearing grateful fruit. If public authorities, beginning with teachers in the schools, would only instill into the public mind the "stop, look, listen" habit at every point of danger, whether at street crossing, public assembly or railway station, the death roll not only

on railways but on our streets and all the thoroughfares of life would quickly show gratifying results.

FATALITIES IN RAILWAY ACCIDENTS SINCE 1888.

From its organization the Commission has taken a lively interest in the compilation and publication of statistics of railway accidents, for which there was both an economic, humane and popular demand. The next statement gives the results of its inquiries since 1888 by classes confined, for the reasons given above, to fatalities.

PASSENGERS, EMPLOYES AND OTHER PERSONS KILLED IN RAILWAY ACCIDENTS FROM 1888 TO 1912.

Year	Passengers	Employees	Other Persons		Total
			Trespassers	Not Trespassing	
1912.....	270	3,283	5,434	1,198	10,185
1911.....	281	3,238	5,284	1,154	9,957
1910.....	324	3,382	4,864	1,112	9,682
1909.....	335a	2,456	5,124	854	8,769
1908.....	406a	3,358	5,560	940	10,264
1907.....	647a	4,353	5,612	1,044	11,656
1906.....	418a	3,807	5,381	949	10,618
1905.....	537	3,261	4,865	940	9,703
1904.....	441	3,367	5,105	868	10,046
1903.....	355	3,233	5,000	879	9,840
1902.....	345	2,516	4,403	871	8,588
1901.....	282	2,675	4,601	897	8,455
1900.....	249	2,550	4,346	660	7,865
1899.....	239	2,210	4,040	635	7,123
1898.....	221	1,958	4,063	617	8,859
1897.....	222	1,693	3,919	603	6,437
1896.....	181	1,861	3,811	595	6,448
1895.....	170	1,811	3,631	524	6,136
1894.....	324	1,823	3,720	580	6,447
1893.....	299	2,627	3,673	647	7,346
1892.....	376	2,554	3,603	614	7,147
1891.....	293	2,660	3,465	611	7,029
1890.....	286	2,451	3,062	536	6,335
1889.....	310	1,972	Not	‡3,541	5,823
1888.....	315	2,070	Given	‡2,897	5,282

‡Includes trespassers.

(a) Passenger totals for these years, and presumably prior thereto since 1901, include fatalities to persons traveling on freight trains and under special agreements, such as postal clerks, express messengers, Pullman employees, newsboys, etc., who do not ordinarily figure in passenger statistics.

A close scrutiny of this table not only bears out the claim that accidents are decreasing relatively to business but shows how casualties rise and fall with the flow and ebb of business activity. Mark, for instance, the decrease in fatalities in the years 1895, 1906 and 1909, following the business recessions of the preceding years.

RELATION OF ACCIDENTS TO PASSENGER TRAFFIC.

While the general effect of traffic on railway casualties has been referred to in the preceding pages, the more direct relation of passenger traffic to the number of passengers killed is shown in the following statement, which gives the number of passengers carried one mile to one killed annually since 1889:

PASSENGERS CARRIED ONE MILE TO ONE KILLED, 1889 TO 1912.

Year	Passengers Killed in Train Accidents	Passengers Carried One Mile	Passengers Carried One Mile to One Killed
1912.....	114	33,510,673,000	293,953,272
1911.....	94	33,201,694,699	353,209,518
1910.....	179	32,338,496,329	180,661,991
1909.....	102	29,452,000,000	288,745,100
1908.....	148	29,082,836,944	196,595,648
1907.....	367	27,718,554,030	72,802,600
1906.....	137	25,167,240,831	183,702,488
1905.....	350a	23,800,149,436	68,000,427
1904.....	270	21,923,213,536	81,197,087
1903.....	164	20,915,763,881	127,535,745
1902.....	170	19,689,937,620	115,823,162
1901.....	110	17,353,588,444	157,759,894
1900.....	93	16,038,076,200	172,463,183
1899.....	83	14,591,327,613	175,799,127
1898.....	74	13,379,930,004	180,809,864
1897.....	96	12,256,939,647	127,676,454
1896.....	41	13,049,007,233	318,268,469
1895.....	30	12,188,446,271	406,281,542
1894.....	162	14,289,445,893	88,206,456
1893.....	100	14,229,101,084	142,291,010
1892.....	195	13,362,898,299	68,522,555
1891.....	110	12,844,243,881	116,765,853
1890.....	113	11,847,785,617	104,847,660
1889.....	161	11,553,820,445	71,762,859

(a) In 1905 and prior thereto, these figures probably include fatalities to many persons not covered by other returns for passengers. See Note to preceding table.

In the matter of fatalities to passengers in train accidents relatively to passenger traffic, 1912 deserves to rank with 1911 as a year of comparative immunity. Only in 1895, when both passenger and freight traffic were simultaneously depressed, have the figures of passenger mortality to the number carried been lower than the average for these two years, when the volume of freight traffic was three times greater than in 1895.

In analysing the statements in this table it must always be borne in mind that peculiar conditions prevailed in 1895. The carrying business was greatly depressed, as evidenced in the drop in passenger mileage shown above, accompanied by a like decrease in freight traffic. The number of employes had been reduced from 873,602 in 1893 to 785,034 in 1895 by the process of eliminating careless, inex-

perienced and inefficient men. The result was a record of immunity from fatalities that can be easily traced in all these statistics.

This record establishes beyond peradventure that the prevention of accidents rests primarily with the human equation. Given careful, experienced and efficient employes and railway operation becomes comparatively safe. Draft into that service suddenly 100,000 or 200,000 inexperienced, careless and only half-trained men, as had to be done in 1906 and 1907, when in two years 289,878 men were added to the payroll, and there is an inevitable increase in casualties as the figures for those years show.

Nothing conduces more to the safe operation of British railways than the permanent character of its staff in which advancement follows merit and experience. It changes so gradually from year to year that it is only enumerated once in four years.

DECREASING HAZARD OF TRAIN CREWS.

The claim of the increasing hazard of railway occupation, especially to train crews, is not sustained by the statistics of fatalities to employes in this important branch of the service, as given in the next table:

SUMMARY SHOWING NUMBER OF TRAINMEN KILLED IN RAILWAY ACCIDENTS, 1889 TO 1912, WITH RATIO TO NUMBER EMPLOYED.

	Trainmen	Trainmen in Yards	Yard Trainmen Switching Crews	All Trainmen	Number of Trainmen for One Killed
1889.....	1,179	.....	.....	1,179	117
1890.....	1,459	.....	.....	1,459	105
1891.....	1,533	.....	.....	1,533	104
1892.....	1,503	.....	.....	1,503	113
1893.....	1,567	.....	.....	1,567	115
1894.....	1,029	.....	.....	1,029	156
1895.....	1,017	.....	.....	1,017	155
1896.....	1,073	.....	.....	1,073	152
1897.....	976	.....	.....	976	165
1898.....	1,141	.....	.....	1,141	150
1899.....	1,155	.....	.....	1,155	155
1900.....	1,396	.....	.....	1,396	137
1901.....	1,537	.....	.....	1,537	136
1902.....	1,507	.....	.....	1,507	135
1903.....	2,021	.....	.....	2,021	123
1904.....	1,181	487	488	2,156	120
1905.....	1,155	386	493	2,034	133
1906.....	1,360	400	575	2,335	124
1907.....	1,507	459	630	2,596	125
1908.....	1,097	362	496	1,955	150
1909.....	789	270	313	1,372	202
1910.....	1,056	325	474	1,855	169
1911.....	905	313	490	1,703	182
1912.....	917	265	481	1,663	192

Mark the decrease in fatalities, both absolutely and relatively, since 1903, and relatively to number employed between the first and the last five years of this table. In order to judge of the trend of accidents comparisons by periods of at least five years are the only safe tests. The variation from year to year may be as accidental as are the accidents themselves.

MISLEADING STATISTICS.

Under the new method of gathering and compiling statistics relating to railway accidents the real value of such work seems to be sacrificed in the effort to focus on railway operation responsibility for a serious condition for which it cannot be held accountable. For instance, the Bulletin for the three months ending June 30, 1912, presents an alarming array of collisions and derailments numbering 3,398, and still more alarming summary of casualties to persons of 2,395 killed and 41,628 injured. From the number and prominence given to the collisions and derailments the reader would expect to find that they were responsible for a great majority of the fatalities only to find that only 40 deaths were due to collisions and 95 to derailments, a total of 135, or less than 6%.

Now there is never much doubt as to the cause of the more prominent railway disasters such as result in the 6% of the fatalities. But there is much doubt and much necessity for enlightenment as to the causes of the 94% of the fatalities. And it is of the highest public interest that all inquiries into the causes of railway accidents should be made by impartial experts.

CAUSES OF ACCIDENTS.

During a series of years the reports of the Commission on "prominent collisions" has established the fact that 17% of them occur between passenger trains, 32% between passenger and freight trains and 51% between freight trains. The same reports go to show that the fatalities from the same collisions are distributed among the several classes of collisions in the proportions of 26%, 38% and 36% respectively. Freight trains figured in 62% of the total collisions and passenger trains 38%, whereas the fatalities from these collisions were divided in the proportion of 55% and 45% respectively.

These returns demonstrate the preponderating effect of our freight service in causing accidents.

These same statistics of "prominent collisions" provided the data for the following compilation of the presumptive causes of 1,023 accidents. Unfortunately the reports from which this summary was compiled ended with the innovations of 1911.

Cause	Number of Accidents
Negligence, Error or Forgetfulness of Some Member of Train Crew.....	337
Recklessness, Carelessness, Overlooking or Disregarding Orders, or Taking Chances, etc.....	297
Disobedience.....	64
Incompetence or Inexperience.....	23
Defect of Equipment, Tires, Wheels, etc.....	84
Defect of Roadway.....	35
Malicious Acts.....	31
Misadventure, Washouts, Landslides, Cyclones, etc.....	104
Undiscovered.....	46
Intoxication.....	2
	1,023

Investigation by the Board of Trade of accidents on British railways finds that nearly half are due to the "want of caution or misconduct on the part of the injured person," 18% to want of caution or breach of rules, etc., on the part of employes other than the person injured, and 19% are ascribed to "misadventure or accidental." Failure or misconduct on the part of the human equation runs through about 95% of all railway accidents and yet we Americans, being of an inventive turn of mind, pay 95% of our attention to mechanical devices and a scant 5% to rectifying the defects in the human factor.

ACCIDENTS ON BRITISH RAILWAYS.

In order to get something approaching a fair basis for comparison of accidents on American and British railways, it becomes necessary to present the statistics for the latter covering a period of at least ten years—our mileage and units of risk being approximately ten times greater than that of British roads. In the following statement the details and totals are those furnished by the British Board of Trade, to which the railways make annual returns:

SUMMARY OF CASUALTIES ON BRITISH RAILWAYS FOR 1911 AND
TOTALS FOR TEN YEARS.

Class	1911		1910	
	Killed	Injured	Killed	Injured
A. Passengers:				
From Accidents to Trains, Rolling Stock, Permanent Way, etc.	14	468	23	1,111
By Accidents from Other Causes.....	98	3,024	98	2,969
Total of Passengers.....	112	3,492	121	4,080
B. Servants of Companies or Contractors:*				
From Accidents to Trains, Rolling Stock, Permanent Way, etc.	5	115	9	113
By Accidents from Other Causes.....	441	27,733	411	25,024
Total of Servants.....	446	27,848	420	25,137
C. Other Persons:				
From Accidents to Trains, etc.....		8	2	7
Persons Passing over Railways at Level Crossings.....	84	38	75	35
Trespassers (including suicides).....	462	124	442	136
Persons on Business at Stations, etc., and Other Persons not Coming in Above Classifications.....	55	748	61	715
Total of Other Persons.....	601	918	580	893
Total all Classes 1911.....	1,159	32,258	1,121	30,110
" " " 1910.....	1,121	30,110		
" " " 1909.....	1,033	28,383		
" " " 1908.....	1,128	28,485		
" " " 1907.....	1,211	25,975		
" " " 1906.....	1,252	20,444		
" " " 1905.....	1,180	18,236		
" " " 1904.....	1,158	18,802		
" " " 1903.....	1,262	18,557		
" " " 1902.....	1,171	17,814		
Total Ten Years.....	11,675	237,624		

*Of contractors' servants in 1911, eleven were killed and thirty-one injured.

Attention is directed to the remarkable increase in the number of injuries reported since 1905. This is purely a paper increase and has no more significance than the reported increase of injuries on American roads since 1909. The whole practice of reporting anything but permanent, and major accidents at that, is a perversion of the purpose of statistics long ago abandoned by the practical and unsentimental German authorities.

AVERAGE PASSENGER FATALITIES ON BRITISH ROADS.

In its general report the Board of Trade presents a short table giving the average number of passengers killed and injured in train accidents, and the average number of passenger journeys for three periods of ten years, and one five ending 1884, 1894, 1904 and 1909, respectively, and for the years 1910 and 1911, as follows:

AVERAGE NUMBER OF PASSENGERS KILLED AND INJURED IN TRAIN
ACCIDENTS ON BRITISH RAILWAYS, 1875 TO 1911.

Year	Number of Passengers Killed and Injured in Train Accidents		Number of Passenger Journeys (exclusive of Journeys by Season-Ticket Holders)* (Millions)
	Killed	Injured	
1875-1884 (Average).....	28	915	598.4
1885-1894 ".....	21	600	798.6
1895-1904 ".....	12	581	1,100.7
1905-1909 ".....	23	447	1,248.4
1910.....	23	1,111	1,306.7
1911.....	14	324	1,326.7

*The number of annual season tickets issued was 752,663 in 1910, and 779,173 in 1911.

As the average passenger journey in the United Kingdom is less than eight miles, its whole passenger service partakes of the nature of suburban traffic on American roads, which is carried with almost perfect immunity from fatalities in train accidents.

RAILWAY ACCIDENTS IN GERMANY.

The following statement presents the official statistics of railway accidents in Germany for the years 1909 and 1910:

SUMMARY OF RAILWAY ACCIDENTS IN GERMANY FOR THE YEARS
1909 AND 1910.

	1909		1910	
	Killed	Injured	Killed	Injured
Passengers:				
In accidents to trains.....	25	305	2	422
Other Accidents:				
Without Fault of Their Own.....	3	68	4	72
As Result of Their Own Carelessness.....	93	194	91	178
Total Passengers.....	121	567	97	672
Employes on Duty:				
In Train Accidents.....	13	189	14	202
In Other Accidents:				
Through Their Own Carelessness in Trains or Cars in Motion	79	286	62	297
In Making up Trains.....	51	259	60	239
In Coupling Cars.....	87	184	92	175
While on Tracks in Way of Moving Cars or Trains.....	242	237	240	218
Through Other Forms of Carelessness.....	61	193	75	219
Total Employes on Duty.....	533	1,348	543	1,350
Other Officials.....	14	50	6	68
Trespassers, Including Employes Not on Duty.....	324	257	280	248
Suicides.....	402	33	338	27
Total Trespassers, Etc.....	740	340	624	345
Total all Classes.....	1,394	2,255	1,264	2,365

The government authorities in Germany make a clear distinction between those casualties which are undeserved (*unverschuldet*) and those which are the result of the victim's own fault (*unorsichtigkeit*). In Germany rules are made to be obeyed and no person can break them and hold the government responsible for any mischance that befalls him. The statistics reflect the government's attitude in this respect, and also very properly exclude accidents in railway workshops from the accidents chargeable to railway operation.

If American statistics of railways were confined to those occurring in connection with the movement of trains, engines and cars, as in Germany, it would reduce our list of fatalities very materially and exclude more than 85% of the injured from the exaggerated totals.

OVERWORK AND RAILWAY ACCIDENTS.

British statistics furnish data for what amounts to a demonstration that there is little or no connection between long hours and accidents. In all reports of investigation it is the rule to give the hours the person involved has been on duty, from which this Bureau has compiled the following summary for eight years ending 1912, giving the returns for the last year by quarters:

HOURS WHEN BRITISH ACCIDENTS OCCUR.

Three Months to	Off duty						Hours on Duty when Accidents Occurred																
		1st	2d	3d	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th or over					
Sept. 30, 1911...	4	18	19	22	16	21	20	19	15	19	22	14	11	4	1	1	0	1					
Dec 31, 1911 ..	4	19	16	25	32	20	17	17	16	16	9	16	11	3	1	0	0	1					
Mar. 31, 1912...	1	23	17	22	18	19	21	13	10	14	19	6	4	2	3	0	0	0					
June 30, 1912...	3	23	14	18	23	20	16	16	12	12	15	6	7	3	0	0	0	0					
Year 1912.....	12	83	66	87	89	80	74	65	53	61	65	42	33	12	5	1	0	2					
" 1911.....	10	95	88	75	90	85	58	74	74	65	73	57	35	13	5	2	1	1					
" 1910.....	13	57	103	83	68	88	72	72	62	64	63	51	32	7	6	1	2	3					
" 1909.....	11	61	72	92	78	69	77	68	60	65	54	51	37	8	0	0	1	0					
" 1908.....	6	60	103	83	85	77	81	72	70	63	57	53	35	8	8	0	0	0					
" 1907.....	1	70	86	78	78	71	64	59	48	68	62	43	35	14	12	5	3	1					
" 1906.....	6	52	64	70	86	63	81	68	70	71	61	42	39	7	4	3	0	2					
" 1905.....	3	52	74	65	54	71	66	59	48	53	56	41	37	7	3	3	0	1					
Eight Years....	62	530	656	633	628	604	573	537	485	510	491	380	283	76	43	15	7	10					

Out of 6,457 cases covered by this table only 32, or one-half of 1%, happened after the fourteenth hour and only 151, or 2.3%, happened after the twelfth. Moreover, the reports of hours worked

in excess of twelve hours on British roads in 1908 was 1.12%, which singularly enough coincided exactly with the percentage of accidents during the excess hours in 1909.

A second glance at this table shows that the greatest number of accidents happened during the second hour on duty, and further analysis reveals that 57% of the total happened during the first six hours. *In no instance was an accident attributed to long hours.*

RAILWAY ACCIDENTS IN EUROPE.

Excluding the returns of injured, because what constitutes a reportable injury is as variously interpreted as there are countries and reporting officials, the following statement gives the number of fatalities on European railways according to the latest available returns from the respective countries:

KILLED IN EUROPEAN RAILWAY ACCIDENTS. (MILES OF LINE REPRESENTED, 194,316)

Country	Year	Pas- sengers	Em- ployes	Other Persons	Total	Preced- ing Year
United Kingdom.....	1911...	112	446	601	1,159	1,121
Germany.....	1910...	97	543	624	1,264	1,394
Russia (a).....	1908...	198	645	1,866	2,709	2,950
France.....	1909...	(b) 8	351	c 333	692	625
Austria.....	1910...	20	112	153	294	313
Hungary.....	1910...	24	140	189	353	356
Italy.....	1910-11	25	107	209	341	438
Spain.....	1907...	25	64	213	302	219
Portugal.....	1904...				55	37
Sweden.....	1909...	6	32	59	97	91
Norway.....	1910-11	1	7	8	16	13
Denmark (d).....	1910-11	1	9	16	26	30
Belguim.....	1910...	11	71	70	152	95
Holland.....	1909...	3	20	9	32	37
Switzerland.....	1910...	7	32	46	85	99
Roumania.....	1910-11	7	28	69	104	18
Total Europe.....		554	2,607	4,465	7,626	7,797
Europe (e).....	1910...	692	2,689	4,461	7,897	.....
".....	1909...	671	2,641	4,322	7,639	.....
".....	1908...	630	2,536	3,580	6,803	.....
".....	1907...	586	2,575	3,400	6,606	.....
".....	1906...	560	2,319	3,553	6,432	.....
".....	1905...	503	2,104	3,414	6,021	.....
".....	1904...	412	1,920	2,665	4,995	.....

(a) Exclusive of local lines and railways of Finland.

(b) In train accidents only.

(c) Excluding suicides, but including passengers killed otherwise than in train accidents.

(d) State railways only.

(e) These figures are those compiled for this Bureau each year since its organization, the details for each country appearing in the report of the report for the following year.

It will be perceived that nearly 60% of the fatalities on European railways are to "other persons," but this term is not everywhere synonymous with "other persons" as used in American railway statistics. In France, for instance, it covers passengers, except those killed in accidents to train. If a passenger in stepping off a French train is killed he becomes statistically an "other person."

In all statistics of accidents on European railways the line is drawn between those killed through no fault of their own, and those who are the victims of their own negligence, imprudence or inadvertence.

The European mileage represented in this table (194,316 miles) approximates that in the United States in 1901 (196,075 miles), when the record of fatalities here was:

**Passengers, 282; Employes, 2,675; Other Persons, 5,498;
Total, 8,455.**

It will be observed that the European railways killed almost twice as many passengers per mile of line, practically the same number of employes and 19% less "other persons." But of the 5,498 "other persons" killed in American railway accidents in 1901, 4,601, or 84%, were trespassers.

Today there are 54,000 more miles of railway in the United States than are accounted for in the above table of European railway accidents, in each mile of which lurks the ever present possibility of a disastrous wreck, which may not occur in a hundred years but which may occur tomorrow. The truly accidental cannot be provided against by human foresight.

XIII STATISTICS OF

The essential features of railway statistics for the leading countries of the world are set forth in the following statement. So far as possible the information has been obtained from official sources or authoritative publications, and where estimates have been inserted, as noted, they have been computed from ascertained facts. The average journey and haul given for British traffic is that furnished by the *London Statist* and is corroborated by the figures of

Country	Year	Miles Covered by Capitalization	Capitalization or Cost of Construction (c)	Passenger Revenue	Freight Revenue	Other Revenues
United Kingdom...	1911	23,417	\$6,447,969,398	\$215,168,940	\$308,197,950	\$96,197,110
German Empire....	1910	36,740	4,163,615,519	198,737,378	452,969,934	69,765,822
France.....	1909	25,017	3,593,660,000	152,566,693	184,394,516	5,284,147
Russian Empire....	1908	41,888	3,378,839,810	80,787,020	306,014,545	39,811,560
Austria.....	1910	14,038	1,654,207,119	48,520,000	135,360,000	12,500,000
Hungary.....	1910	12,821	858,732,000	25,009,200	65,460,200	4,265,800
Italy (a).....	1910-11	8,908	1,131,300,000	36,060,084	60,247,652	5,264,847
Spain (a).....	1905	8,810	649,919,610	16,215,866	34,694,555	6,190,271
Portugal.....	1908	1,465	162,385,280	4,039,350	5,715,150	351,750
Sweden.....	1909	8,366	277,952,716	12,225,160	20,762,228	992,672
Norway.....	1911	1,891	81,467,176	2,667,672	3,437,904	359,656
Denmark (a).....	1911	1,215	70,277,640	5,429,948	5,942,900	796,496
Belgium (a).....	1910	2,685	504,210,184	19,750,243	38,275,374	1,672,178
Holland (a).....	1910	1,978	d 163,798,304	12,374,800	12,094,800	1,272,400
Switzerland.....	1910	2,924	341,208,367	18,542,282	22,577,912	1,809,944
Roumania.....	1911	2,153	186,670,372	.....	.....	.....
Total Europe.....		194,316	\$23,666,213,495	\$948,095,636	\$1,656,145,620	\$246,534,653
Canada.....	1912	26,727	1,585,724,797	55,543,664	148,030,269	14,820,819
Argentina.....	1910	17,381	868,914,950	.....	.....	.....
Japan (a).....	1911	4,764	411,598,253	21,072,498	20,428,230	2,646,015
British India.....	1910	32,099	f1,448,700,000	63,261,000	100,419,000	5,019,000
New South Wales...	1912	3,831	260,613,180	11,439,630	18,092,050	2,079,490
New Zealand.....	1911	2,761	153,448,830	5,521,470	9,805,390	2,144,045
United States.....	1912	248,888	14,657,545,000	668,642,865	1,980,805,606	221,288,226

the North Eastern Railway of England, the only British road giving such information.

From the data here furnished it is possible to make a close approximation of the actual passenger and freight mileage and traffic conditions in the countries named. Within the four corners of this

FOREIGN RAILWAYS

table are contained the figures establishing the amazing leadership of the United States in everything pertaining to the development of transportation by rail.

For the purposes of this table, taxes have been added to the operating expenses of American railways.

Here the writer wishes to make acknowledgment for the courtesy of the Railway Departments of Japan, Canada and New South

Total Revenues	Operating Expenses	Rates Expenses to Revenues	Passengers Carried	Average Journey (Miles)	Freight Tons Carried	Average Haul (Miles)	Per Cent Net Revenue to Capital
\$619,564,000	\$380,689,660	61.8	1,793,820,800	b 7.8	523,653,094	b 25.0	3.67
722,473,134	490,999,236	67.9	1,549,872,110	14.2	531,527,817	60.4	5.74
342,245,356	200,834,642	58.6	491,936,930	20.5	165,027,920	80.2	3.94
426,613,125	344,497,405	80.8	162,117,000	79.0	229,554,000	160.1	2.43
196,380,000	150,860,000	76.9	254,618,531	18.3	137,599,886	68.2	2.75
94,735,200	61,362,800	64.7	140,002,000	19.5	68,806,000	72.9	3.87
101,572,383	81,486,337	80.3	.....	b 25.0	.....	b 66.0	1.77
57,100,692	27,750,936	48.6	41,846,249	b 26.0	22,662,548	69.4	4.50
10,106,250	4,672,500	46.2	14,585,698	b 20.0	4,315,385	b 54.0	3.35
33,981,060	26,836,984	79.0	53,787,226	16.6	31,133,715	43.4	2.57
6,465,232	4,803,096	74.2	13,795,396	16.1	5,196,241	38.6	2.22
12,169,344	11,257,072	92.5	22,344,630	21.8	4,934,799	53.1	1.33
59,697,795	39,123,036	65.5	173,491,334	15.4	58,793,837	49.7	3.80
25,742,000	21,365,860	83.0	47,711,000	17.9	16,702,400	51.9	2.67
42,930,138	27,230,010	63.2	110,068,465	13.0	16,466,758	45.5	4.60
18,756,585	11,660,674	62.1	10,233,000	43.7	8,823,551	b 96.5	3.80
\$2,770,532,294	\$1,885,610,248	68.0	\$4,871,230,369	15.1	1,825,197,951	64.3	
219,403,752	150,726,539	68.7	41,124,181	70.8	89,444,331	218.7	4.27
107,058,065	63,616,485	59.4	59,014,600	24.2	33,606,626	120.9	3.85
44,147,128	21,624,686	48.9	138,629,706	21.9	25,481,868	83.5	5.47
163,729,000	89,595,000	53.1	371,580,000	36.1	65,600,000	184.3	5.46
31,611,170	20,303,030	64.2	70,706,728	15.4	10,631,751	81.0	4.35
17,470,905	11,516,860	64.8	11,200,613	b 23.0	5,863,674	80.0	4.02
2,870,736,697	e2,108,351,953	73.4	994,382,480	33.7	1,806,175,565	148.0	5.25

(a)State only. (b)Estimated. (c)From latest report, not always year named. (d)Estimated capital cost of Holland's railways not given since 1897. (e)Including taxes. (f)Valuing the Indian rupee at 33 cents (.324 1-2)

Wales for early copies of the very complete and valuable railway statistics of their respective countries to the dates mentioned in the table.

RAILWAYS OF CANADA.

STATISTICS OF THE RAILWAYS OF THE DOMINION FOR THE YEARS
ENDING JUNE 30, 1908, 1911 AND 1912.

	1908	1911	1912
Miles of Line Operated.....	22,966	25,400	26,727
Second Track.....	1,211	1,610	1,752
Yard Track and Sidings.....	4,546	5,550	6,149
All Tracks.....	28,723	32,560	34,629
Capital Cost*			
Stock.....	\$607,425,349	\$749,207,687	\$770,459,351
Funded Debt.....	631,869,664	779,481,514	818,478,175
Government Railways.....	109,423,104	119,615,666	133,306,218
Subsidies.....	166,291,482	202,179,254	204,932,573
Total Capital Cost.....	\$1,515,009,559	\$1,850,484,121	\$1,926,906,317
Per Mile of Line.....	65,968	72,854	72,129
Passenger Traffic			
Passengers Carried.....	34,044,992	37,097,718	41,124,181
Passengers Carried 1 Mile.....	2,081,960,864	2,605,968,924	2,910,251,636
Average Journey (miles).....	61	70	71
Average Passengers per Train.....	54	60	62
Mileage of Passenger Trains.....	31,950,349	36,985,911	40,440,393
Mileage of Mixed Trains.....	6,210,867	6,277,468	6,473,882
Receipts from Passengers.....	\$39,992,503	\$50,566,894	\$56,543,664
Receipts per Passenger Mile (cents)...	1.920	1.944	1.943
Freight Traffic			
Tons Carried.....	63,019,900	79,884,282	89,444,331
Tons Carried 1 Mile.....	12,961,512,519	16,048,478,295	19,558,190,527
Average Haul (miles).....	206	200	218
Freight Train Mileage.....	40,476,370	52,498,866	60,126,023
Average Tons per Train.....	278	305	325
Receipts from Freight.....	\$93,746,655	\$124,743,015	\$148,030,260
Receipts per Ton Mile (mills).....	7.23	7.77	7.57
Miscellaneous Receipts.....	\$13,179,155	\$13,423,585	\$14,829,819
Total Receipts.....	146,918,313	188,733,493	219,403,752
Expenses of Operation			
Way and Structures.....	\$20,778,610	\$29,245,093	\$31,514,098
Maintenance of Equipment.....	20,273,626	26,127,638	29,811,510
Traffic Expenses.....		4,831,744	5,293,700
Conducting Transportation.....	62,486,270	66,343,270	78,969,543
General Expenses.....	3,765,636	4,487,039	5,137,688
Total Expenses.....	\$107,304,142	\$131,034,784	\$150,726,539
Ratio to Earnings.....	73.04%	69.44%	68.7%
Net Receipts.....	\$39,614,171	\$57,698,709	\$68,677,213
Percentage to Capital Cost.....	2.61%	3.12%	4.27%
Gross Receipts per Mile.....	\$6,398	\$7,430	\$8,209
Gross Expense per Mile.....	4.672	5.158	5.639
Number of Employes.....	106,404	141,224	155,901
Compensation.....	\$60,376,607	\$74,613,738	\$87,299,639
Proportion of Gross Earnings.....	41.10%	39.53%	39.79%
Proportion of Operating Expenses....	56.27%	56.94%	57.92%
Average per Employe per Year.....	\$569	\$528	\$560

*The net capital liability of the Canadian railways, exclusive of Government owned roads, in 1912 was \$1,378,937,726 or \$51,593 per mile, which is far below their "capital cost."

In 1911 the railways of Canada paid \$2,200,528 taxes. In Nova Scotia and New Brunswick they are exempt from taxation.

RAILWAYS OF THE UNITED KINGDOM.

STATISTICS OF MILEAGE, CAPITALIZATION, AND TRAFFIC FOR THE YEARS 1907, 1910 AND 1911.

	1907	1910	1911
Length of Railways			
Double Track or More (miles).....	12,845	13,072	13,106
Single Track.....	10,263	10,315	10,311
Total Length of Line.....	23,108	23,387	23,417
All Tracks, Sidings, Etc.....	53,158	54,311	54,576
Total Capitalization (paid up).....	\$6,302,099,773	\$6,421,170,080	\$6,447,969,398
Capitalization per Mile of Line...	272,723	274,562	275,354
Passenger Traffic			
Passengers Carried.....	1,259,481,000	1,306,728,583	1,326,316,990
Season Ticket Journeys.....	445,101,956	451,597,800	467,503,800
Passengers Carried 1 Mile.....	13,295,747,058	13,731,760,000	13,991,802,162
Average Journey (miles).....	7.8	7.8	7.8
Receipts from Passengers.....	\$205,036,740	\$210,612,890	\$215,168,940
Receipts per Passenger Mile (cents)...	1.54	1.534	1.538
Mail, Parcels, Luggage, Etc.....	\$43,213,632	\$46,318,570	
Freight Traffic			
Minerals, Tons Carried.....	407,602,177	405,087,175	409,812,101
General Merchandise.....	108,284,939	109,341,631	113,765,077
Total Freight, Tons.....	515,887,116	514,428,806	523,577,178
Tons Carried 1 Mile.....	12,897,177,900	12,860,721,150	13,089,429,450
Average Haul (miles).....	25	25	25
Receipts from Freight.....	\$298,058,610	\$299,397,860	\$308,198,217
Receipts per Ton Mile (cents).....	2.31	2.328	2.354
Miscellaneous Receipts.....	\$45,634,648	\$47,180,560	\$47,582,044
Total Receipts†.....	\$591,943,630	\$603,509,880	\$619,561,905
Expenses of Operation.....	373,085,840	372,891,030	382,868,802
Ratio of Expenses to Earnings...	63.0	61.8	6.18
Net Receipts.....	\$218,857,790	\$230,618,850	\$236,693,103
Percentage to Paid-Up Capital...	3.47	3.59	3.67
Gross Receipts per Mile.....	\$25,616	\$25,805	\$26,457
Gross Expenses per Mile.....	16,165	15,945	15,900
Number of Employees*.....	621,341	608,750	608,750
Total Compensation.....	\$158,116,560	\$158,932,400	\$164,781,320
Proportion of Gross Earnings.....	26.7	26.3	26.6
Proportion of Operating Expenses...	42.4	42.6	43.1
Average per Employee per Year.....	\$254.47	\$261.10	\$270.70
Taxes included in Expenses.....	\$23,682,810	\$24,846,740	\$24,733,914

*No enumeration of employees was made between 1907 and Dec. 31, 1910; the last preceding, in 1904, gave a total of 581,664.

†Includes Rents, Tolls, Steamboats, etc.

RAILWAYS OF GERMANY.

STATISTICS OF MILEAGE, COST OF CONSTRUCTION, AND TRAFFIC FOR
THE YEARS 1906, 1909 AND 1910.

	1906	1909	1910
Length of State Railways (miles).....	32,050	34,058	34,547
Length of Private Railways.....	2,513	2,167	2,193
Total.....	34,563	36,235	36,740
Cost of Construction.....	\$3,613,493,706	\$4,048,810,560	\$4,163,615,519
Cost per Mile.....	104,548	111,737	113,324
Passenger Traffic			
Passengers Carried.....	1,209,224,072	1,469,639,916	1,540,872,110
Passengers Carried (one mile).....	17,189,336,940	20,862,117,120	21,948,393,727
Average Journey (miles).....	14.21	14.17	14.24
Receipts from Passengers.....	\$170,165,002	\$190,350,960	\$200,407,588
Receipts per Passenger per Mile (cents)	0.99	.913	0.913
Freight Traffic			
Fast Freight and Express			
Tons Carried.....	3,791,769	4,195,098	4,708,317
Tons Carried One Mile.....	255,115,720	273,234,000	295,296,195
Average Haul (miles).....	69.91	65.1	62.71
Receipts from Same.....	\$16,924,080	\$17,471,520	\$19,118,701
Receipts per Ton Mile (cents).....	6.38	6.36	6.42
All Freight			
Tons Carried.....	455,144,382	491,024,070	531,527,817
Tons Carried One Mile.....	28,118,620,680	30,917,232,220	32,124,223,390
Average Haul (miles).....	61.78	61.3	60.4
Receipts from Freight.....	\$397,580,738	\$425,517,120	\$456,766,493
Receipts per Ton Mile (cents).....	1.41	1.41	1.41
Miscellaneous Receipts.....	\$63,151,060	\$66,433,200	\$71,368,311
Total Receipts.....	\$630,796,800	\$632,301,280	\$728,542,392
Expenses of Operation.....	407,174,400	481,728,720	495,125,338
Ratio Expenses to Earnings.....	64.5	70.6	67.96%
Net Receipts.....	\$223,622,400	\$200,572,560	\$233,417,054
Percentage on Cost of Construction.....	6.18	5.09	5.74%
Gross Receipts per Mile.....	\$18,251	\$18,830	\$19,830
Gross Expenses per Mile.....	11,780	13,018	13,476
Number of Employees.....	648,437	691,087	700,370
Total Compensation.....	\$219,390,932	\$264,047,660	\$271,836,773
Proportion of Gross Earnings.....	34.78	38.7	37.3%
Proportion of Operating Expenses.....	53.88	54.8	54.8%
Average per Employee per Year.....	\$338.35	\$382.10	\$388.17

*The official statistics for Germany for the year 1910 only reached Chicago on April 10, 1912, in time for insertion here but not for use in the body of the report where those given relate to the preceding year.

Owing to the early publication of this report the Bureau is not able to avail itself of the official statistics of the German railways for 1911. These statistics are generally due in March of the second year following that to which they relate.

XIV

RAILWAY RECEIVERSHIPS IN 1912

Including the Pere Marquette, ten roads operating 3,728 miles with a capitalization of \$180,137,497 were placed in the hands of receivers during the calendar year 1912.

During the same period twelve roads with a mileage of 661 and a capitalization of \$25,920,990 were sold under foreclosure.

RAILWAY RECEIVERSHIPS IN 1912.

Name of Company	Railroad Mileage	Funded Debt.	Stock
Denver, Lar. & North Western.....	56	\$1,500,000	\$24,243
Denver, North Western & Pacific.....	211	11,288,609	10,940,700
Florida Central.....	48	500,000	50,000
Kansas City, M. & O.....	764	21,146,000	25,000,000
Kansas City Outer Belt.....			
Laramie, Hahn's Peak & Pacific.....	110	3,940,000	9,100,000
Pere Marquette.....	2,331	63,672,000	26,186,590
Pittsburgh & Susquehanna.....	22	390,000	264,000
Western Allegheny.....	50	150,000	1,511,110
Wisconsin & Michigan.....	136	3,518,245	956,000
Total.....	3,728	\$106,104,854	\$74,032,643

The number, mileage and capitalization of the railways that have failed since 1876, as given in the *Railway Age Gazette*, follow:

RECEIVERSHIPS SINCE 1876.

	Roads	Miles	Bonds and Stock (Thousands)		Roads	Miles	Bonds and Stock (Thousands)
1876.....	42	6,662	\$467,000	1894.....	38	7,025	\$395,791
1877.....	38	3,637	220,294	1895.....	31	4,089	369,075
1878.....	27	2,320	92,385	1896.....	34	5,441	275,597
1879.....	12	1,102	39,367	1897.....	18	1,537	92,909
1880.....	13	885	140,265	1898.....	18	2,069	138,701
1881.....	5	110	3,742	1899.....	10	1,019	52,285
1882.....	12	912	39,074	1900.....	16	1,165	78,234
1883.....	11	1,990	108,470	1901.....	4	73	1,627
1884.....	37	11,033	714,755	1902.....	5	278	5,835
1885.....	44	8,836	385,460	1903.....	9	229	18,823
1886.....	13	1,799	70,346	1904.....	8	774	36,069
1887.....	9	1,046	90,313	1905.....	10	3,593	176,321
1888.....	22	3,270	186,814	1906.....	6	204	55,042
1889.....	22	3,803	99,664	1907.....	7	317	13,585
1890.....	26	2,963	105,007	1908.....	24	8,009	596,359
1891.....	26	2,159	84,479	1909.....	5	859	78,095
1892.....	36	10,508	357,092	1910.....	7	735	51,427
1893.....	74	29,340	1,781,046	1911.....	5	2,606	210,606
				1912.....	10	3,728	180,137
Total 36 years.....					734	135,567	\$7,812,697

XV GROWTH OF RAILWAYS

In three-quarters of a century American railways from small beginnings in Pennsylvania in 1827, Maryland in 1828, South Carolina in 1830, and New York and Massachusetts in 1831, show the following remarkable growth by decades:

PROGRESS OF RAILWAYS IN THE UNITED STATES SINCE 1835.

States	1835	1840	1850	1860	1870	1880	1890	1900	1910
Alabama.....	46	46	75	743	1,429	1,851	3,148	4,219	5,022
Arkansas.....				38	256	896	2,113	3,341	5,135
California.....				23	925	2,220	4,148	5,744	7,655
Colorado.....					157	1,531	4,154	4,587	5,519
Connecticut.....		102	402	601	742	954	1,007	1,023	1,000
Delaware.....	16	39	39	127	224	280	328	346	335
Florida.....			21	402	446	530	2,390	3,272	4,370
Georgia.....		185	643	1,420	1,845	2,535	4,105	5,639	7,020
Idaho.....						220	941	1,261	2,168
Illinois.....			111	2,799	4,823	7,955	9,843	10,997	11,876
Indiana.....			228	2,163	3,177	5,454	5,891	6,469	7,420
Iowa.....				655	2,683	5,235	8,347	9,180	9,733
Kansas.....					1,501	3,439	8,806	8,719	9,007
Kentucky.....	15	28	78	534	1,017	1,598	2,694	3,059	3,518
Louisiana.....	40	40	80	335	479	633	1,658	2,824	5,469
Maine.....		11	245	472	786	1,013	1,313	1,915	2,248
Maryland and D. C..	117	213	259	386	671	1,012	1,168	1,407	1,413
Massachusetts.....	113	301	1,035	1,264	1,480	1,893	2,094	2,118	2,109
Michigan.....		50	342	779	1,638	3,931	6,789	8,193	8,985
Minnesota.....					1,072	3,108	5,466	6,942	8,669
Mississippi.....			75	862	990	1,183	2,292	2,919	4,413
Missouri.....				817	2,000	4,011	5,897	6,867	8,078
Montana.....						48	2,181	3,010	4,207
Nebraska.....					1,812	2,000	5,274	5,684	6,067
Nevada.....					593	769	925	909	2,277
New Hampshire.....		53	467	661	736	1,015	1,133	1,239	1,246
New Jersey.....	99	186	206	560	1,125	1,701	2,034	2,237	2,255
New York.....	104	374	1,361	2,682	3,928	6,019	7,462	8,121	8,416
North Carolina.....		53	154	937	1,178	1,499	2,904	3,808	4,734
North Dakota.....					35	635	1,940	2,731	4,201
Ohio.....		30	575	2,946	3,538	5,912	7,719	8,774	9,128
Oklahoma.....						275	1,213	2,150	5,978
Oregon.....					159	582	1,269	1,723	2,279
Pennsylvania.....	318	754	1,240	2,598	4,656	6,243	8,307	10,277	11,084
Rhode Island.....		50	68	108	136	210	212	212	212
South Carolina.....	137	137	289	973	1,139	1,429	2,096	2,795	3,410
South Dakota.....					30	630	2,485	2,850	3,948
Tennessee.....				1,253	1,492	1,824	2,710	3,124	3,809
Texas.....				307	711	3,293	7,911	9,873	14,243
Utah.....					257	770	1,090	1,547	1,986
Vermont.....			290	554	614	912	913	1,012	1,081
Virginia.....	93	147	384	1,379	1,486	1,826	3,142	3,729	4,443
Washington.....						274	1,699	2,890	4,858
West Virginia.....					387	694	1,306	2,198	3,526
Wisconsin.....			20	905	1,525	3,130	5,468	6,496	7,328
Wyoming.....						472	941	1,228	1,600
Arizona.....						384	1,061	1,511	2,097
New Mexico.....						643	1,284	1,752	2,999
District of Columbia.									36
Total.....	1,098	2,818	9,021	30,635	52,922	93,671	159,271	192,940	238,609

GROWTH OF RAILWAYS OF THE WORLD.

In the following table is given the mileage of the principal countries in the world from the earliest date available to the latest:

Country	Miles of Road Completed									
	Opened	1840	1850	1860	1870	1880	1889	1899	1910†	1912†
Great Britain...	1825	1,857	6,621	10,433	15,537	17,933	19,943	21,666	23,280	23,417
United States..	1827	2,818	9,021	30,626	52,922	93,296	160,544	.....	236,422	248,888
Canada.....	1836	16	66	2,065	2,617	7,194	12,585	17,250	24,731	26,727
France.....	1828	.....	1,714	5,700	11,142	16,275	21,899	26,229	29,364	30,119
Germany.....	1835	341	3,637	6,979	11,729	20,693	24,845	31,386	36,235	37,255
Belgium.....	1835	207	554	1,074	1,799	2,399	2,776	2,883	2,888	5,132
Austria (proper)	1837	.....	817	1,813	3,790	7,083	9,345	11,921	13,591	14,038
Russia in										
Europe.....	1838	.....	310	988	7,098	14,026	17,534	26,889	35,347	41,888
Italy.....	1839	13	265	1,117	3,825	5,340	7,830	9,770	10,425	10,425
Holland.....	1839	10	110	208	874	1,143	1,632	1,966	2,235	2,439
Switzerland...	1844	.....	15	653	885	1,596	1,869	2,342	2,791	3,034
Hungary.....	1846	.....	137	1,004	2,157	4,421	6,751	10,619	12,177	12,821
Denmark.....	1847	.....	20	69	470	975	1,217	1,764	2,121	2,121
Spain.....	1848	.....	17	1,190	3,400	4,550	5,951	8,252	8,961	9,272
Chili.....	1851	.....	.....	120	452	1,100	1,801	2,791	3,451	3,451
Brazil.....	1851	.....	.....	134	504	2,174	5,546	9,195	11,863	12,968
Norway.....	1854	.....	.....	42	692	970	970	1,231	1,608	1,845
Sweden.....	1856	.....	.....	375	1,089	3,654	4,899	6,663	8,321	8,554
Argentine Re-										
public.....	1857	.....	.....	.....	637	1,536	4,506	10,013	14,111	18,166
Turkey in										
Europe.....	.....	.....	.....	41	392	727	1,024	1,900	1,967	2,100
Peru.....	.....	.....	.....	47	247	1,179	993	1,035	1,470	1,470
Portugal.....	.....	.....	.....	42	444	710	1,118	1,475	1,689	1,689
Greece.....	1869	.....	.....	.....	6	7	416	604	845	979
Uruguay.....	1869	.....	.....	.....	61	268	399	997	1,371	1,443
Mexico.....	1868	.....	.....	.....	215	655	5,012	8,503	14,845	14,990
Roumania.....	.....	.....	.....	.....	152	859	1,537	1,920	1,976	2,153
Australia*	.....	.....	.....	.....	.....	789	4,850	11,111	17,956	18,195
Japan.....	1874	.....	.....	.....	.....	75	542	3,632	5,130	5,130
British India...	1853	.....	.....	838	4,771	9,162	15,887	23,523	30,809	32,099
China.....	1883	.....	.....	.....	.....	.....	124	401	4,997	5,274
Africa.....	.....	.....	.....	.....	.....	583	2,873	5,353	19,207	20,758

*Including New Zealand.

†Or latest figures.

‡Includes Asiatic Railways.

XVI

COST OF RAILWAY REGULATION

The cost of regulating American railways continues to increase in a faster ratio than anything else pertaining to them, not even excepting taxes. The record of the growth of this tax on the general revenues is given in the following table of yearly expenditures:

1888	Five Commissioners.....	\$ 97,867
1889	" ".....	149,453
1890	" ".....	180,440
1891	" ".....	214,844
1892	" ".....	221,745
1893	" ".....	217,792
1894	" ".....	209,250
1895	" ".....	216,206
1896	" ".....	234,941
1897	" ".....	234,909
1898	" ".....	237,358
1899	" ".....	238,125
1900	" ".....	243,624
1901	" ".....	255,979
1902	" ".....	271,728
1903	" ".....	298,842
1904	" ".....	321,533
1905	" ".....	330,739
1906	" ".....	382,141
1907	Seven Commissioners.....	616,597
1908	" ".....	736,530
1909	" ".....	983,936
1910	" ".....	1,163,336
1911	" ".....	1,290,978
1912	" ".....	1,469,689
Increase in 24 years		1403 per cent

If the quality of regulation increased in proportion to the quantity as represented in the Commission payroll, American railways should be the best regulated railways on earth.

RECOMMENDATIONS

In conclusion I would reiterate the following recommendations:

STATISTICS.

Congress should relieve the Commission of the duty of collecting and compiling statistics, to the end that these may be restored to their true office of providing early, accurate and unbiased information respecting railway operation. They might well be entrusted to a Bureau of the Department of Commerce and Labor. It is essential to the highest use of statistics that they shall not be compiled under the sole supervision of the authority charged with their judicial interpretation.

ACCIDENTS.

As the prevention of accidents and not the adoption of various patented devices or imposing fresh and onerous regulations on the railways should be the controlling idea of all investigations of railway accidents, their investigation should be vested in a Board of Inspectors independent of the Interstate Commerce Commission.

The system of investigating railway accidents in the United Kingdom which has been in successful operation for half a century affords an example by which we might profit. The chief inspectors are men of exceptional qualifications and independent judgments. Their opinions are not formed to please the companies or catch the popular ear. Their suggestions have the weight of authority and experience more effective than an act of parliament.

Such a report as that rendered by the Public Service Commission of the State of New York on the collision at Corning last July is as illuminating as it is exceptional in the record of railway investigations in this country. This report and those of the Block Signal and Train Control Board show that we can get intelligent and fair investigation of railway affairs when we set about it.

SLASON THOMPSON

March 1, 1913.

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The Railway Dollar

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What Became of It IN 1912

NOTE - The Shaded Circle shows the 73.57% that went to Operating Expenses and Taxes.